REPORT
STATE BOARD OF HEALTH
MICHIGAN

1915

FORTY-THIRD ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1915.

BY AUTHORITY

LANSING, MICHIGAN
WYNKOOP HALLENBECK CRAWFORD CO., STATE PRINTERS
1917

LETTER OF TRANSMITTAL.

Office of
Secretary of the State Board of Health,
Lansing, Michigan, July 1, 1915.

To the Honorable Woodbridge N. Ferris, Governor of Michigan:

SIR:—In compliance with Sec. 5 §4401, Act 18, P. A. 1905, of the laws of Michigan governing this Board, I have the honor to herewith submit my annual report for the fiscal year ending June 30, 1915.

Very respectfully,

JNO. L. BURKART,

Secretary and Executive Officer, State Board of Health.

MEMBERS

OF THE

MICHIGAN STATE BOARD OF HEALTH.

Victor C. Vaughan, Ph. D., M. D., *President*, Ann Arbor	January 31, 1919.
Edward T. Abrams, M. D., *Vice-President*, Hancock	January 31, 1921.
John L. Burkart, M. D., *Secretary and Executive Officer*, Lansing	March 29, 1917.
John H. Kellogg, M. D., Battle Creek	January 31, 1917.
Andrew P. Biddle, M. D., Detroit	January 31, 1919.
Henry S. Bartholomew, M. D., Lansing	January 31, 1917.
William D. Farley, L. E., Battle Creek	January 31, 1921.

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PART I.

REPORT OF THE SECRETARY FOR THE FISCAL YEAR, JULY 1, 1914, TO JUNE 30, 1915.

EXTRACTS OF MINUTES OF BOARD MEETINGS.

REGULAR QUARTERLY MEETING HELD AT LANSING, JULY 10, 1914.

The members present were Drs. Vaughan, Koon, Biddle, Kellogg, Mr. Ranger and the Secretary.

The Sanitary Engineer recommended that the Board pass a resolution making it obligatory upon any municipality which discontinues the flow of hypochloride for more than twenty-four hours, to notify the Board of the fact giving reasons therefor, and an estimate of the limit of time this condition is likely to be continued. The recommendation of the Sanitary Engineer was adopted and the Secretary was instructed to promulgate the order.

A resolution prohibiting cheese and butter factories from putting their wastes into public streams or dry ditches without the advice or permission of this Board was adopted.

The city of Marlette was given twelve months in which to correct the sewerage nuisance which they were maintaining.

A resolution authorizing the preparation of a district or county health officer's bill, along the lines of the Amberson Bill, to be presented to the legislature of 1915, was adopted.

The rules and regulations of the Board in regard to communicable diseases were revised and a new list ordered published by the Secretary.

The Secretary was instructed not to move from his present quarters until something fully as good or better was offered instead.

The necessity of establishing Medical Milk Commissions in every community where possible to do so was agreed upon and the Secretary instructed to communicate with the various cities in the State in an effort to secure the establishment of these Commissions.

A resolution authorizing increased efforts against the spread of tuberculosis and cancer by means of literature, lectures and exhibits was adopted.

REGULAR QUARTERLY MEETING HELD IN LANSING, OCTOBER 9, 1914.

The members present were Drs. Koon, Biddle, Kellogg, Abrams, Mr. Ranger and the Secretary.

The resignation of Mrs. Alice Hill, Financial Clerk, because of continued illness, was received and accepted.

A resolution granting Mr. Callio of Calumet, an Embalmer's license was adopted.

Upon motion diplomas from Embalming schools other than the U. of M., Ann Arbor, Michigan, were not accepted until approved by the National Embalmers' Board.

On motion the following were issued licenses as Embalmers: Messrs. Hallworthy and F. H. Schlecting.

Upon motion the Secretary was instructed to prepare a design of badge for use by the Medical Inspectors and employees of this Board.

Upon motion of Dr. Kellogg, a resolution that the President appoint a committee of one to raise $20,000 for the purpose of making a survey of the State, relative to tuberculosis and cancer, the object being, not to find out how many people are suffering from these diseases, but to stir up the public to the importance of doing something that will indefinitely control these diseases, the legislature to be asked for an appropriation of a similar amount for the purpose of making a health survey which should be under the joint control of the State Board of Health and the Anti-Tuberculosis Association or a committee appointed by these bodies, was adopted.

Upon motion of Mr. Ranger, December 8, 9 and 10, 1914, was selected for the next Embalmers' Examination, to be held in Lansing, Michigan.

On motion the meeting was adjourned until December 8, 1914, when the Secretary was instructed to have ready for presentation to the Board some definite plans for improved public health supervision to submit to the legislature of 1915.

SPECIAL MEETING HELD AT LANSING, DECEMBER 8, 9, AND 10, 1914.

The members present were Drs. Vaughan, Kellogg, Biddle and the Secretary.

The Secretary presented an outline of a bill providing for dividing the State into thirty districts with a full time health officer, to be known as a district health officer, in charge. At this meeting a number of the representative medical men of the State of Michigan were present for the purpose of advising the Board, relative to the best plan to pursue in regard to legislative matters for bettering the present inefficient methods of public health supervision. After considerable discussion the Secretary was authorized to confer with the Attorney General's office for the purpose of drafting a proper bill for district medical inspectors, to be presented to the legislature of 1915.

Upon motion the advisability of recognizing midwives by licensing them was rejected.

Upon motion of Dr. Biddle, the collection of vital statistics and the compilation thereof was deemed to be part of the legal work of the State Board of Health, and the legislature was to be asked for authority to change the present method and bring it under the direction of the State Board of Health.

Upon motion of Dr. Burkart the employment of a State Dental Surgeon by the State Board of Health was deemed advisable, provided the legislature would grant the authority to do so and provide for the salary thereof which should not exceed $2000 per annum.

The Secretary presented the design for an insignia of the State Board of Health of Michigan, and upon motion of Dr. Kellogg the design was accepted and the Secretary instructed to place the necessary order.

The Secretary reported that the physical condition of Mr. C. M. Ranger prohibited him from conducting the Licensed Embalmers' examination and permission was asked to employ Mr. W. D. Farley of Battle Creek. Granted.

The Secretary asked that the Board authorize the preparation of a bill increasing the salary of the Assistant Secretary of this Board from $1500 to $2500, for the purpose of employing a capable medical man in that position. Approved.

Upon motion of Dr. Biddle, Drs. Abrams, Kellogg and the Secretary were

made a committee of three to revise the public health laws and ask the legislature to increase the salary of both the Secretary and his assistant.

Upon motion the Board decided to select a suitable bacteriologist to become the head of the Bacteriological Division of the State Board of Health.

REGULAR QUARTERLY MEETING HELD AT LANSING, JANUARY 8, 1915.

The members present were Drs. Vaughan, Kellogg, Biddle and the Secretary.

Upon motion an Embalmers' license was granted to Mr. Gabriel Davis of Detroit, he having taken the examination December 8, 9 and 10, 1914, at Lansing, Michigan.

The Secretary read a communication from the Michigan Securities Commission asking that an investigation under the direction of the State Board of Health be made of the apparatus and claims of the National Pure Water Company, of Detroit, Michigan, a firm desiring privilege to incorporate under the Michigan laws for the purpose of selling a device for the purifying of water by electrolysis, and further presented the report of the State Sanitary Engineer and the Bacteriologist of the Board, Dr. M. L. Holm, upon the investigations made which were transmitted to the Securities Commission.

The Secretary reported upon the efforts made to secure a bacteriologist to succeed Dr. M. L. Holm, and submitted correspondence from several sources. Upon motion of Dr. Kellogg the selection of a bacteriologist for the State Board of Health was left with the President and the Secretary of this Board.

The Secretary reported the death of Mr. Charles M. Ranger of Battle Creek, in December, 1914, and suggested that Mr. W. D. Farley, a licensed embalmer of Battle Creek, be recommended to the Governor for appointment as member of this Board in Mr. Ranger's place. The Secretary advised the Board that Governor Ferris assured him that Mr. Farley would be appointed because the Board recommended him.

The committee appointed to revise the public health laws of Michigan reported and the report of the committee was adopted. The Secretary recommended that trachoma be placed upon the list of reportable communicable diseases. Carried.

The Secretary reported that the Deputy Auditor General advised the employment of the Acting Medical Inspectors of the Engineering Division on a salary instead of a per diem basis. The report was accepted and adopted.

The Secretary moved that Dr. E. T. Abrams, whose term of office on this Board expired January 31, 1915, be recommended to Governor Ferris for reappointment as a member of the Michigan State Board of Health.

The Secretary presented to the Board the financial report and activities of the Board for the past quarter. Vouchers were signed and reported adopted.

SPECIAL MEETING HELD IN LANSING, FEBRUARY 11, 1915.

The members present were: Drs. Vaughan, Kellogg, Abrams, and the Secretary.

The Secretary presented a communication from the legislative committee of the Funeral Directors' and Embalmers' Association of Michigan, asking that another licensed embalmer be placed upon the State Board of Health.

because in their judgment only licensed embalmers should conduct these examinations. On motion the request was denied and permission was given the licensed embalmers to withdraw from the protection of the State Board of Health if they so desired and establish a board of their own.

The Secretary reported that the various bills authorized by the Board had been prepared and presented to the legislature.

REGULAR QUARTERLY MEETING HELD AT LANSING, APRIL 9, 1915.

The members present were: Drs. Vaughan, Biddle, Abrams, Kellogg, Mr. Farley and the Secretary.

The Secretary reported that Mr. W. D. Farley, having been appointed by the Governor and confirmed by the Senate, and having filed his oath of office, was now a duly qualified member of the State Board of Health and entitled to a voice and vote on this Board.

The Secretary suggested that the State Board of Health employ a Public Health nurse if the legislature could be induced to make the necessary appropriation, the object being to increase the war against tuberculosis.

The Secretary reported that arrangements had been practically completed with Dr. A. A. Spoor, of Omaha, Neb., to be bacteriologist for the State Board of Health, to succeed Dr. M. L. Holm. Upon motion of Dr. Biddle the report of the Committee was accepted and the selection of Dr. Spoor authorized.

The Secretary reported the dangerous illness of Dr. Thomas Koon, a member of this Board.

On advice of the Secretary, Anthrax, Actinomycosis, Leprosy, Paratyphoid Fever, Impetigo Contagiosa, and Pellagra were placed upon the list of reportable communicable diseases.

The Secretary presented a communication from the National Embalmers' Association, relative to a uniform form of transportation blanks and submitted a communication from Mr. John Maas, President of the North American Conference of Embalmers Examining Boards, suggesting that Michigan adopt a blank wherein a copy of the death certificate was attached to the transportation blank. Upon motion of Dr. Biddle, supported by Dr. Kellogg, this blank was adopted.

Upon motion of Mr. Farley, July 17, 18 and 19, 1915, were selected as the dates for the next Embalmers' examination to be held in Detroit.

Upon motion of Mr. Farley, supported by Dr. Kellogg, the Board adopted a resolution requiring all applications for Embalmers' Examinations to be made thirty days before the date of the examination.

The Secretary presented a communication from the Cincinnati College of Embalming asking that this Board recognize the course of instructions in that College in the same manner as it does the University of Michigan. Upon motion of Dr. Abrams, supported by Dr. Biddle, the request was denied.

The Secretary read a communication from Hastings, Michigan, asking that an extension of time be granted them in which to comply with the orders of this Board, relative to changes in the sewer system of that city.

Upon motion of Mr. Farley, supported by Dr. Biddle, the Secretary was authorized to attend the National Conference of Charities & Corrections to be held at Baltimore, Md., May 12-19, 1915.

Dr. Kellogg suggested that the Board appoint a committee on a health campaign which would be authorized to organize the State into Health Educational Districts, enlisting the cooperation of the newspapers and

various Women's Clubs, and other Organizations throughout the State, this Committee to assist in arranging Good Health Weeks and arousing the community to the necessity of organizing against the spread of Tuberculosis and the distribution of impure milk, inspection of schools and school children, etc. Dr. Kellogg advised the Board that he would present them with $1000 to defray the expenses of the persons starting this work. Upon motion of Dr. Kellogg, supported by the Secretary, an organizing committee was appointed, consisting of Drs. Kellogg, Abrams and the Secretary, with authority to organize and carry on a health educational campaign and to appoint sub-committees to raise funds necessary for such campaigning.

The Board gave audience to Messrs. Westover and Tippey of the Cadillac Water Works, who desired that the City of Cadillac be granted a reasonable length of time in which to comply with the order of this Board requiring Cadillac to install a purification plant for their public water supply. Upon motion of Dr. Abrams, supported by Dr. Biddle, the time was extended to one year.

EXAMINATION AND LICENSING OF EMBALMERS.

Under the provisions of Act No. 132, Laws of 1903, two examinations were held during the fiscal year ending June 30, 1915, as follows:

Grand Rapids, July 7, 8 and 9, 1914. Lansing, December 8, 9 and 10, 1915.

Of the 64 persons examined, 50 were granted licenses.

Reciprocal licenses were granted in only three instances.

A statement of expenses incurred in the operation of Act 132 may be found on a subsequent page of this report.

The following letter, issued in June, 1914, will serve to show the scope of the embalmers' examination, and the conditions to be complied with on the part of the applicants for examination:

STATE BOARD OF HEALTH,

OFFICE OF THE SECRETARY, LANSING.

To the Funeral Directors and Embalmers.

GENTLEMEN:—

You are hereby informed that a meeting of the State Board of Health, called for the purpose of conducting an Embalmers' Examination, will be held in the city of Detroit, July 27, 28 and 29th, 1915, in the Detroit College of Medicine Building. The examination will commence at 9 o'clock, Tuesday morning, July 27th.

Candidates will be required to take both *written* and *oral* examinations with demonstration on the cadaver. Oral examinations will be given in the order applications are received. Some of the general subjects included in the written examination are:

(a) Visceral anatomy and the circulation of the human body, both arterial and venous.

(b) The nature, action, modes of action and comparative value of disinfectants.

(c) The methods of embalming and preparing bodies for transportation, also shipping rules.

(d) How diseases are spread, the best method for the restriction of diseases, and bacteriology in relation to the spread of diseases.

(e) The signs of death and the manner in which it is determined.

Those who desire to take the examination at this time, must fill out and return to the Secretary of the Board, the enclosed application blank, with an unmounted photograph of the applicant, signed in ink on the back and properly certified to by a notary. A fee of five dollars must accompany the application. Remittances may be made by express or postoffice money order or by registered letter. *Personal checks cannot be used.*

Applications should be on file in this office *thirty days* before the date of examination.

Application must be made in the name of an individual, and not of a firm.

Applicant's name must be signed in full.

In the examination, a rating of at least seventy-five per cent must be made by the applicant to secure a license.

By direction of the State Board of Health,

JNO. L. BURKART,
Secretary.

GENERAL AND SPECIAL WORK IN THE OFFICE OF THE SECRETARY.

Much of the general work of the office naturally groups itself under three heads: the collection of information, the compilation of information so collected, and the dissemination of such information as will be of service in the restriction and prevention of disease.

COLLECTION OF INFORMATION.

As the local health officer is the principal medium by which this Board may reach and instruct the public in matters pertaining to the prevention of sickness and deaths, the appointment, and the return of the names and postoffice addresses of the health officers, in each year, are matters of more than ordinary interest and importance.

In each year, it is often necessary to make a first, second and third request for information which will place this office in communication with the local health officers, and during the time which is thus used up in corresponding and waiting, an outbreak of a dangerous disease may begin and become widespread before this office can afford the usual assistance to the proper officials in the locality.

It should be said, however, that there is an increasing tendency to comply with the law in this particular, and local boards of health now generally act promptly and co-operate cordially with this Board for the suppression of disease.

Having established communication with the newly appointed local health officers, pamphlets and other publications which may aid them in their work, together with the usual blanks for reports of outbreaks of diseases in their locality, are mailed from this Board. In some instances, considerable correspondence is necessary to instruct the health officials how to properly care for sick and infected persons, and to make reports which will be of value in the compilations for the annual reports and other publications of this Board.

In addition to the collection of the usual information relative to outbreaks of dangerous communicable diseases in this State, special information upon subjects of public interest and importance, is sometimes asked for and is usually cheerfully furnished by a large number of health officers and other persons from whom the information is sought.

DISSEMINATION OF INFORMATION.

As stated in the preceding paragraph, each newly appointed health officer is supplied, by this office, with information relative to his duties. This information is contained principally in a pamphlet entitled "Health Officers' Manual," and in pamphlets covering the principal points in the etiology and methods of restriction and prevention of each of the dangerous communicable diseases.

Upon the receipt of information relative to an outbreak of a dangerous communicable disease, in addition to the usual instructions and blanks for making the reports, there are mailed to the health officers a sufficient number

of pamphlets, relative to the particular disease then present, for distribution to the families and immediate neighbors of the sick person. In this way, the people are educated as to their duty, under the law, and their co-operation with the local health officers often secured.

A pamphlet covering the law respecting nuisances, and containing information relative to their suppression, is published, and distributed among those persons directly interested, when a complaint of a nuisance is made to this office.

A pamphlet, giving the law and regulations of this Board, respecting the preparation and shipment of dead bodies, is published, and distributed among the licensed embalmers, railroad officials, and other persons interested in the transportation of the dead.

ANNUAL REPORTS.

About 2,500 copies of the annual report are published each year and about 2,400 copies are distributed among the following:

Members and ex-members of the State Board of Health; local health officers; secretaries of state, territorial and provincial boards of health; sanitary journal exchanges; library exchanges; city hospitals and sanatoriums; presidents and secretaries of county medical societies and State libraries.

PUBLIC HEALTH BULLETINS.

Beginning with the fiscal year, July 1, 1913, the quarterly bulletins issued by this Board were discontinued, and a monthly publication, greatly enlarged, covering various topics, directly and indirectly pertaining to all public health questions intended for the general public, is now being issued instead. Copies of this publication, *Public Health*, may be obtained upon request.

HEALTH TRAIN.

The success of the health train venture of 1913 prompted the Board to conduct a similar tour during the month of August and the first week of September, 1914. The schedule was so arranged as to take in the principal cities and villages of the Thumb district, that extreme eastern side of the lower peninsula, and the more populous communities above the Straits. An idea of the territory covered by the exhibit during both seasons can be obtained by a study of the map on page 143 of this report.

These tours were conducted in conjunction with the State Dairy and Food Department. The 1914 train consisted of two exhibit cars (one for the Dairy and Food Department and one for the Board of Health) and a sixteen section Pullman sleeper for the accommodation of those members of the two Departments that accompanied and demonstrated the exhibit.

The display was so arranged as to make it possible for the crowds to traverse the center of the cars, the various charts, mechanical models, etc., being placed along both sides. Either the Secretary or the Assistant Secretary, together with members of the various divisions, were constantly on hand to explain the different exhibits and to pass out literature to all who appeared interested in the quest of knowledge relating to life's battle with disease.

The special train, in charge of Assistant Secretary D. E. McClure, left Lansing August 3, 1914, taking the predetermined route shown upon the map, and arriving in Menominee August 14. Secretary Dr. John L. Burkart arrived at this point and conducted the train throughout the remainder of the trip.

The running schedule was previously arranged and was adhered to as closely as possible, the time alloted to each station being determined chiefly upon a population basis. Advertising material was mailed ahead to the local health officers of all communities at which the train was scheduled to stop, and with but few exceptions this method of announcing the coming of the train was very effective. In nearly every instance it was necessary to inform large numbers of interested citizens that the schedule required the closing of doors. This statement never failed to bring forth such exclamations as "The time alloted is altogether too short;" "I would like to spend a whole week studying that exhibit;" "The best thing the State ever did, but they should come oftener and stay longer;" "I wish the whole town could have seen this exhibit. It would have opened their eyes."

The people of Michigan are greatly indebted to officials of the various railroads traversed and to the Pullman Company, for had it not been for their generosity there would have been no "Health and Food Special." Cars for exhibit and transportation were furnished by the railroad companies and the Pullman Company gratuitously tendered the use of a Pullman and the services of a porter for the accommodation of the members of the party.

It was interesting to note the sudden changes of facial expression when the people were informed that cars and transportation were furnished to the State without charge and that no additional offices had been created in order to conduct the tour.

The people seemed to thoroughly enjoy the time spent in the car, and it is firmly believed that they left it with the thought that even human life has an economic value, and that perhaps the maintenance of an efficient health organization to teach the people of Michigan how lives can be and are being saved is a good thing after all.

Based upon his experience of the 1914 tour, the Secretary believes that the exhibit system is one of the most effective methods of educating the people along lines relating to the conservation of public health, and sincerely hopes that the day is not far distant when the Legislature will see fit to substantially endorse this method of promulgating knowledge of the ways and means necessary for the general betterment of the sanitary and hygienic condition of our State.

On every hand the question was asked, "Why does not the State have a car of its own, equipped as this is, which can be a rolling school of education, moving about the State constantly, distributing literature and demonstrating the value of 'Health First?'" Echo answers, why?

LABORATORY DIVISION.

LANSING LABORATORY REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1915.

To the Secretary of the State Board of Health:

Dear Doctor:—I have the honor to herewith submit a report of the work done at the laboratory for the fiscal year ending June 30, 1915.

Summary of examinations for the year ending June 30, 1915, compared with summary of examinations for year ending June 30, 1914.

	1915.	1914.
Total number of examinations	10,855	7,884
Chemical and bacteriological examinations of water for potability	1,382	1,136
Sputa and other discharges examined for tubercle bacilli	3,106	3,081
Throat swabs examined for diphtheria bacilli	4,353	1,290
Blood samples examined for Widal's reaction	770	832
Chemical and miscroscopical examinations of urine	140	127
Pathological examinations of feces	14	19
Pathological examinations of tumors	43	30
Miscellaneous blood examinations	14	32
Chemical and bacteriological examinations of milk	587	619
Examinations for venereal disease	159	497
Toxicological and medico-legal examinations	13	45
Beverages examined	35	44
Other miscellaneous examinations	239	132

SUMMARY OF EXAMINATIONS ARRANGED BY MONTHS.

Month.	Waters.		Sputa, tuberculosis.		Throat swabs, diphtheria.		Blood, Widal's reaction.		Smears, veneral.		Miscellaneous.	Total.
	Safe.	Unsafe.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		
July, 1914	49	46	58	190	39	134	8	53	5	7	95	684
August, 1914	78	82	45	180	47	59	31	56	8	16	46	648
September, 1914	82	73	47	133	55	136	24	70	4	16	127	767
October, 1914	33	47	47	133	105	166	24	84	5	12	93	749
November, 1914	53	53	29	137	309	1,056	16	42	4	3	8	1,710
December, 1914	41	20	34	169	290	547	6	51	4	5	88	1,255
January, 1915	44	18	64	176	103	260	8	37	4	8	80	802
February, 1915	65	15	66	207	44	184	12	42	6	8	91	740
March, 1915	97	68	66	312	34	171	15	55	2	10	197	1,027
April, 1915	149	23	103	253	53	192	4	45	6	2	111	941
May, 1915	138	35	70	243	42	211	1	34	3	8	69	854
June, 1915	45	28	81	263	19	97	4	48	5	8	80	678
Total	874	508	710	2,396	1,140	3,213	153	617	56	103	1,085	10,855

SUMMARY OF WATER EXAMINATIONS FOR THE YEAR ENDING JUNE 30, 1915.

Location.	Safe.	Unsafe.	No. examined.
Adrian	4	6	10
Ahmeek	1	0	1
Albion	0	1	1
Algonac	1	0	1
Allen	1	0	1
Almont	2	0	2
Alpena	119	67	186
Amasa	0	2	2
Amble	1	0	1
Applegate	0	1	1
Atlantic Mine	0	1	1
Augusta	1	0	1
Bancroft	2	1	3
Battle Creek	1	0	1
Bay City	18	5	23
Belleville	0	1	1
Bellevue	0	4	4
Bennington	5	1	6
Bentley	0	1	1
Benton Harbor	5	1	6
Benzonia	1	0	1
Bergland	0	1	1
Berrien Springs	1	0	1
Bessemer	2	0	2
Birmingham	1	1	2
Black River	0	2	2
Blissfield	0	1	1
Bloomingdale	1	0	1
Boyne City	1	0	1
Boyne Falls	2	0	2
Breckenridge	1	0	1
Brighton	2	0	2
Brooklyn	2	2	4
Broomfield	0	1	1
Bronson	2	0	2
Brown City	1	0	1
Bruce Crossing	1	0	1
Burnips Corners	1	0	1
Burr Oak	3	1	4
Cadillac	10	24	34
Calumet	5	0	5
Camden	1	0	1
Carleton	0	1	1
Carson City	1	0	1
Caseville	0	1	1
Casnovia	1	0	1
Cass City	2	0	2
Cassopolis	1	0	1
Cedar Springs	1	0	1
Cheboygan	4	1	5

Location.	Safe.	Unsafe.	No. examined.
Chelsea	0	1	1
Clare	0	1	1
Clio	2	2	4
Coldwater	1	0	1
Colon	0	1	1
Columbus	0	1	1
Comstock	1	0	1
Conklin	1	0	1
Constantine	1	0	1
Coopersville	0	1	1
Coral	1	0	1
Crystal	1	3	4
Crystal Falls	3	4	7
Dearborn	4	5	9
Decatur	3	3	6
Deckerville	0	1	1
Detroit	5	0	5
Devils Lake	0	2	2
Dewitt	1	0	1
Durand	0	1	1
Eaton Rapids	7	1	8
East LeRoy	1	0	1
East Lansing	0	1	1
Edwardsburg	3	0	3
Elkton	1	0	1
Elsie	2	0	2
Emmett	1	1	2
Farmington	0	1	1
Flint	4	2	6
Frankfort	12	2	14
Fremont	1	0	1
Fulton	1	0	1
Gagetown	0	1	1
Grand Rapids	17	16	33
Grandville	3	0	3
Gladstone	11	7	18
Grayling	2	0	2
Gobleville	1	0	1
Greenfield	1	0	1
Greenland	1	0	1
Greenville	2	0	2
Gwinn	1	0	1
Hamilton	2	0	2
Hancock	1	3	4
Harrison	1	0	1
Harrisville	0	1	1
Hastings	3	0	3
Hemlock	1	0	1
Henderson	1	0	1
Hersey	1	0	1
Hesperia	1	0	1
Hillman	0	1	1
Hillsdale	13	6	19
Holland	20	34	54
Holly	1	0	1
Holt	3	1	4
Homer	1	0	1

Location.	Safe.	Unsafe.	No. examined.
Hopkins	1	0	1
Howell	2	0	2
Howlett	1	0	1
Hubbell	1	0	1
Hudson	0	1	1
Ionia	3	0	3
Iron Mountain	2	0	2
Ironwood	11	6	17
Ithaca	2	0	2
Jackson	0	1	1
Jasper	0	2	2
Jennings	8	3	11
Jonesville	1	0	1
Kalkaska	2	0	2
Kawkawlin	1	0	1
Kent City	1	0	1
Laingsburg	4	2	6
Lake City	1	0	1
Lake Harbor	6	4	10
Lansing	22	3	25
Lapeer	5	2	7
Lambertville	0	1	1
LaSalle	1	0	1
Lawrence	2	1	3
Leslie	0	1	1
Lewiston	1	0	1
Ludington	7	3	10
Macon	1	0	1
Mackinac Island	2	0	2
Mackinaw	1	0	1
Manistee	8	0	8
Maple Rapids	1	0	1
Marcellus	4	2	6
Marquette	2	2	4
Marshall	4	2	6
McCords	2	0	2
Manton	1	0	1
Mason	1	1	2
Mears	1	0	1
Menominee	1	1	2
Merrill	0	1	1
Midland	2	2	4
Monroe	4	14	18
Morrice	1	1	2
Mt. Clemens	3	3	6
Mt. Pleasant	1	1	2
Muir	1	4	5
Mulliken	0	2	2
Munger	0	2	2
Munising	5	1	6
Muskegon	0	1	1
Nashville	2	3	5
New Buffalo	1	1	2
New Hudson	1	0	1
New Troy	1	1	2
Niles	4	2	6
Northville	3	0	3
Norway	7	2	9

Location.	Safe.	Unsafe.	No. examined.
Ontonagon	2	1	3
Orchard Lake	0	3	3
Orion	2	0	2
Osseo	1	0	1
Otsego	7	13	20
Owendale	1	0	1
Owosso	17	13	30
Oxford	1	0	1
Palmyra	1	1	2
Parkville	3	0	3
Paw Paw	3	2	5
Pentwater	1	0	1
Petersburg	1	0	1
Petoskey	10	0	10
Pewamo	2	1	3
Pinckney	1	0	1
Portage Lake	2	4	6
Port Huron	12	10	22
Portland	4	0	4
Port Sanilac	0	1	1
Powers	0	1	1
Railroad Samples	200	34	234
Ravenna	0	1	1
Reading	1	2	3
Reed City	1	2	3
Redridge	7	3	10
Reeds Lake	1	3	4
Republic	1	0	1
Rochester	0	2	2
Rockford	1	1	2
Rogers City	1	0	1
Royal Oak	4	2	6
Rushton	0	1	1
Saginaw	12	1	13
St. Clair	0	1	1
St. Ignace	1	0	1
St. Johns	1	0	1
Saline	0	1	1
Saranac	0	1	1
Sault Ste. Marie	2	1	3
Sawyer	2	1	3
St. Joseph	7	3	10
Schoolcraft	3	0	3
Shelby	1	0	1
Shelldrake	1	1	2
Sherman City	1	0	1
South Haven	1	1	2
South Boardman	0	1	1
South Lyons	0	1	1
Sparta	1	1	2
Spring Arbor	1	0	1
Stanton	1	0	1
Stephenson	0	1	1
Sturgis	5	1	6
Swartz Creek	1	0	1
Tecumseh	2	0	2
Three Oaks	1	0	1
Traverse City	5	6	11

Location.	Safe.	Unsafe.	No. examined.
Union City	1	0	1
Unknown	5	10	15
Wahjamega	3	0	3
Wakefield	1	1	2
Watersmeet	1	1	2
Wayne	0	1	1
Webberville	1	0	1
Wheeler	1	0	1
Whitehall	1	0	1
Whittemore	0	2	2
Wilmot	6	3	9
Woodland	4	14	18
Wolverine	0	1	1
Wyandotte	7	7	14
Vermontville	1	0	1
Vriesland	0	3	3
Vulean	2	1	3
Ypsilanti	3	0	3
Zeeland	2	1	3
Unclassified samples from rural districts	24	25	49

SUMMARY OF THROAT SWABS EXAMINED.

Total number of throat swabs examined		4,353
Total number showing B. Diphtheria	1,140	
Total number showing absence of B. Diphtheria	3,213	
Total number of throat swabs examined for release from quarantine		2,728
Total number showing B. Diphtheria present	564	
Total number showing B. Diphtheria absent	2,164	
Total number of throat swabs examined for diagnosis		1,625
Total number showing B. Diphtheria present	576	
Total number showing B. Diphtheria absent	1,049	
Total number of throat swabs examined from cases where previous diagnosis of diphtheria had been made from clinical findings		483
Total number showing B. Diphtheria present	266	
Total number showing B. Diphtheria absent	217	
Per cent of cases of clinical diphtheria not caused by B. Diphtheria		44
Total number of throat swabs examined where clinical diagnosis was regarded as questionable		732
Total number showing B. Diphtheria present	220	
Total number showing B. Diphtheria absent	512	
Per cent of questionable cases found to be diphtheria		30
Total number of throat swabs examined for cases where previous diagnosis other than diphtheria has been made		410
Total number showing B. Diphtheria present	90	
Total number showing B. Diphtheria absent	320	
Per cent found to be diphtheria		22

Respectfully,

A. A. SPOOR,

Bacteriologist.

DIVISION OF SANITARY ENGINEERING.

ANNUAL REPORT OF THE STATE SANITARY ENGINEER FOR 1915.

DR. JOHN L. BURKART, Secretary, State Board of Health, Lansing, Michigan.

Dear Doctor:—I herewith hand you my report for the year ending June 30, 1915.

ORGANIZATION OF THE OFFICE FORCE.

The personnel of the staff at the time of the last report has been continued through the year with the addition on January 1, 1915, of Mr. Harold G. McGee as Acting Medical Inspector. Mr. McGee resigned on June 1, 1915, to accept appointment as Sanitary Engineer for the City of Jackson and was succeeded here by James W. Follin.

FILING PLANS OF WATER AND SEWER SYSTEMS.

Obtaining plans of water supplies and sewer systems in accordance with Act 98, P. A. 1913, has entailed considerable work in the office and the results of our labors in this regard are shown in Tables No. 1 to No. 9 inclusive.

EXAMINATION OF PLANS OF PUBLIC BUILDINGS.

Table No. 10 shows a list of plans for public buildings recommended for approval.

CONFERENCES, CONSULTATIONS AND INSPECTIONS.

In Table No. 11 may be found a list, alphabetically arranged, of visits made during the year for the purpose of assisting municipalities or city officials in solving their local problems of sanitation. The growth of this work is shown graphically by months in a diagram following Table No. 11. The problems deserving special mention are as follows:

1. *Adrian Water Supply.*—On March 6th, Mr. McGee visited Adrian to investigate the extent of changes being made to the filtration plant of the Adrian Water Company. These changes comprise the construction of a three-hour coagulation basin, a device without which the plant has been operated heretofore, the construction of new chemical tanks, the installation of a new dosing device, and the substitution of six rectangular concrete-box filters, of approximately one-half million gallons capacity per day each, for the six old round wooden tub filters of 360,000 gallons capacity each. It is not planned to install water measuring devices or to improve the present open clear well.

2. *Alpena Water Supply.*—A recurrence of typhoid fever in Alpena during the winter and spring of 1915 impelled the health officer to ask for our assistance in locating the cause of the trouble. Accordingly Mr. McGee made an investigation on February 15th and 16th and again on March 16th

to 25th. On the last occasion he was accompanied and assisted by Mr. E. R. Chambers, Assistant Bacteriologist of the State Board of Health.

All possible sources of the disease as well as the history of each case was most thoroughly inquired into from which it became evident that the water supply was chiefly responsible, with the possibility of milk being a contributory cause in a slight degree. There seems to be some probability that the existence of connections between the city water mains and the private water supplies of certain industrial establishments taken from the polluted Thunder Bay river may have had a bearing on the epidemic. It has been recognized for some years that the freezing of the water in Thunder Bay has had a direct effect on the typhoid rates of Alpena but the exact connection has never been established.

As stated in the last annual report, hypochlorite treatment of the water has been in continuous use since April, 1913. Inasmuch as this remedy has not materially reduced the incidence of typhoid fever, especially during winter seasons, a thorough study of its operation and efficiency was made by Messrs. McGee and Chambers. Their findings indicate the following chances for variation between the actual dose administered to the water and that intended to be used.

a. Variation in strength of the chemical as commercially produced.
b. Deterioration or loss of strength after the container has been opened.
c. Failure in the manipulation of dissolving the powder which has been weighed out, to get it all into solution.
d. Variation in discharge of the orifice box used to control the chemical feed.
e. Failure to adjust the flow of chemical to the variations in rate of pumping.
f. Variation in quality of the Bay water, especially with respect to organic content resulting from changes of Bay currents and from fluctuations in the rate of intake.

As a result of carefully made tests conducted during twelve hours on March 24, 1915, it was found that the dose applied to the water might vary by reason of a favorable combination of the factors mentioned above from a maximum of 1.08 to a minimum of 0.12 parts per million when treating at a supposed rate of 0.50 parts per million of available chlorine. In the light of this discovery it is not at all surprising that polluted water has been delivered to the consumers and that a typhoid epidemic has been the result.

The facts disclosed by the investigation formed the basis of the following recommendations:

1. That the public water supply of Alpena is unsafe for drinking purposes without purification.
2. That filtration will prove the most satisfactory method of purification.
3. That the supply can be made moderately safe by sterlization, but,
4. That the present chlorinating apparatus is practically worthless.
5. That an improved hypochlorite plant or the installation of a suitable liquid chlorine apparatus will produce much more satisfactory results.

6. That sterilization not preceded by filtration will never yield at all times a sanitarily safe and yet esthetically pleasant water at Alpena.

3. Cadillac Water Supply.—On July 31st, 1914, I made an inspection of Lake Cadillac, now used as the source of water supply for the city of Cadillac.

The water system is owned by a private company and the untreated water of the lake is furnished to the citizens. Two chemical plants manufacturing charcoal, discharge some waste material into the lake which imparts a slight taste of creosote at certain times of the year. The waters of the lake are heavily charged with green plant life during the summer season and these tend to produce objectionable tastes. One or more storm sewers empty into the lake in such a position that the drift of water from their outlets would tend to pass near or over the intake. These sewers carry no sanitary flow, but I believe that the street washings are to some degree dangerous to public health.

I have examined the reports of the laboratory and find the following results of examinations of the Cadillac water supply:

October 17, 1910, bacterially suspicious, chemically bad.
July 5, 1912, bacterially safe, chemically bad.
May 18, 1914, bacterially unsafe.
June 16, 1914, bacterially unsafe.
July 9, 1914, two samples, both bacterially unsafe.
August 5, 1914, bacterially unsafe.
August 26, 1914, bacterially unsafe.
September 17, 1914, bacterially suspicious.
September 28, 1914, safe.

It will be noticed that of these ten determinations on samples taken chiefly during the past summer, only one shows the water to be fit for domestic consumption without treatment.

There are a number of private and semi-public wells distributed throughout the higher portions of the town and these are used quite extensively for drinking purposes. A number of samples from such wells have been submitted by Mr. O. E. Carr, City Manager, and I believe that quite a majority of these are found to be unsafe.

On March 22, 1915, the Secretary sent to the Cadillac Water Company an order to install a filtration system at their plant. On March 31st, Mr. Tippy, representing the Company, called at the office and was given advice in regard to the cost of construction and operation of water filters.

On April 9, 1915, a hearing was given the Cadillac Water Company by the State Board of Health. The Company was represented by Messrs. Tippy and Westover and the whole matter was thoroughly discussed and as a result the Company was allowed one year in which to construct the plant. Shortly thereafter, Mr. Westover informed us by letter that a system of well water supply was being taken into consideration as a possible substitute for filtration.

The problem of an improved water supply for Cadillac is somewhat complicated in some of its legal and financial aspects and it is quite possible that more than a year may be required to work out the details.

4. Coldwater Sewage Disposal.—The city of Coldwater is served with a

complete system of separate sewers. A treatment plant was put into operation about 1906, consisting of septic tanks and sand filters. The septic tanks have been in continuous operation, but the filters were never a success. The department has recommended minor changes in the baffles in the tanks which have materially increased their efficiency, and through the cooperation of the Superintendent of Public Works, Mr. K. E. Norton, the total flow has been gauged with the view of determining some method of treating the tank effluent on filters of some description if it should become necessary. There is an abnormal amount of leakage to be contended with. This is one reason why the filters were never put into operation.

5. Dearborn Water Supply.—The distribution system at Dearborn was completed late in the fall of 1914, but only a comparatively few house connections have been made thus far.

The filter plant erected by Mr. Henry Ford is completed and working at low capacity in furnishing water to the Ford estate and a few residents of the village. This installation is modern in every respect and a great credit to the village. Standard methods of rapid sand filtration with coagulation and followed by disinfection, are used. A competent operator is in charge and a bacteriological laboratory is nearly ready for use for the purpose of keeping continuous records of the operation of the plant. Pending the opening of the laboratory, samples are being sent to the laboratory of the State Board of Health at frequent intervals.

6. Detroit Sewage Disposal. — Mr. Clarence W. Hubbell has been retained by the city of Detroit to make a study of sewerage conditions looking to the restriction of pollution in the Detroit river. Arrangements have been made whereby the cooperation of Professor Phelps of the U. S. Hygienic Laboratory, with Mr. Hubbell has been secured. H. C. McRae, formerly Division Engineer of the Baltimore Sewerage Commission, has been engaged by the government and located in Detroit as Prof. Phelps' representative. Five or six assistant engineers are employed in the office and the work seems to be progressing in a very thorough manner. On April 24th, I had a conference with Messrs. Hubbell and McRae relative to the sewerage of the districts outside the limits of the city of Detroit which are likely to come into the city in the future. It was agreed that all possible influence should be brought to bear on these localities to construct sewers on the separate system and thus add no more than absolutely necessary to the already heavy burden of the city with regard to sewage treatment. As these localities are not within the limits of any incorporated municipality, Act 98, P. A. 1913, does not apply to them and we have no jurisdiction directly over their sewer systems, but perhaps we can accomplish something by advice. It was suggested by Messrs. Hubbell and McRae that the only way to get complete control over this question would be the creation by the legislature of a sanitary district comprising all the territory in the vicinity of Detroit likely to be concerned in the problem, as was done in Chicago. I am heartily in accord with this idea.

7. East Grand Rapids Water Supply.—The village of East Grand Rapids installed a public water supply during the summer of 1914. The water was to be obtained from wells about 120 feet deep. A 2-inch test well was sunk and its behavior upon pumping indicated that the supply was ample. However, when two six-inch wells were put down and pumps attached, the supply of ground water was found to be local and entirely inadequate in quantity. A study of the geological formation of the vicinity made evident the futility of further attempts to obtain a deep well supply.

The village authorities asked the State Board of Health for permission to use water from Reed's Lake, but this was refused unless some method of treatment should be employed which will render the water safe for drinking purposes. After due investigation liquid chlorine was decided upon and installed.

In locating the intake a very unusual piece of good fortune was accidentally hit upon. It was supposed that Reed's Lake is fed by springs, but no particular attention had ever been given to their location and this was not to be taken into account in building the intake. After its completion, repeated tests of the lake water indicated that it is consistently pure far beyond what could be expected in a lake used for boating, bathing and even the disposal of sewage. Subsequent examinations by a diver revealed the fact that the end of the intake had been inadvertently placed in close proximity to a huge boiling spring on the lake bottom which undoubtedly furnishes all or nearly all the flow into the intake pipe. This circumstance coupled with the liquid chlorine treatment should insure a valuable water supply to the village.

8. Escanaba Water Supply.—The recommendations enumerated in the 1914 report as having been made to the North Michigan Water Company have been complied with and their wisdom has been indicated by the improved results of filter operation.

9. Garbage Collection and Disposal.—Since the spring of 1914, the city of Lansing has been vexed with the problem of garbage collection and disposal. It was with the idea of placing this office at the disposal of the city as well as to collect valuable information for the use of all the cities of the state that the State Sanitary Engineer made a trip through Ohio, accompanied by Mr. Frank B. Drees, representing the Lansing City Council, to study the garbage methods in vogue in that state. An exhaustive report of our findings has been presented to the Lansing Council and has been printed as Engineering Bulletin No. 6. In addition to the data gathered on the trip we have ascertained the conditions in Michigan cities and villages of 1,000 population and over by sending out the following questions:

NAME OF CITY OR VILLAGE.....

Do you have a system of GARBAGE COLLECTION?.....

If so, who pays for the service?.....

Does the collection cover the whole or only a portion of the Corporation?.....

How often, and by what means is it collected?.....

How and where is it disposed of?.....

In case you have no system of collection, what becomes of the garbage in your community?

.....

Signed.....

The replies to these questions have been tabulated as follows:

Total replies received	158
No system worthy of consideration	103
Municipal collection	32
Private collection	21
Collected from the entire city	30
Collected from part of the city	22
Disposal by dumping on land	12
Disposal by burial	18
Disposal by burning on the dump	11
Disposal by feeding to swine	14
Disposal by incineration (privately owned)	1
Disposal by reduction (privately owned)	1
Disposal by incineration contemplated	2
Disposal by reduction contemplated	1

One of the contemplated incinerators is already under construction. (Iron Mountain).

We are convinced by these replies that garbage collection and disposal is a much neglected duty in Michigan and hope that our efforts will result in improved conditions.

10. Grand Rapids Sewage Disposal.—Within the past few days the report of Professors Hoad and Decker on the sewage disposal problem of Grand Rapids has been placed in the hands of the Board of Public Works of that city. The engineers recommended two treatment plants—one on each side of the river. The treatment will be by means of coarse screens, grit chambers and Imhoff tanks. The discharge of the tanks will enter the Grand River through multiple outlets. The works are designed for a nominal capacity of 23 million gallons per day and so arranged as to be easily added to in case of future demand.

As a result of exhaustive studies, it has been found that by careful arrangement of intercepting sewers, the entire works will operate by gravity at ordinary stages of the river. This obviates the necessity of expensive pumping which seemed necessary at first sight.

11. Harbor Beach Sewerage and Sewage Disposal.—A proposal for bonding Harbor Beach for the construction of the above improvements was passed upon favorably by the voters in November, 1914. Contracts have been awarded for a system of sewers and disposal by means of Imhoff tanks and sand filters, but some delay has been necessary on account of legal complications.

12. Health Train.—An engineer from the Sanitary Engineer's office accompanied the "Health Train" upon its entire journey. Mr. Don W. Bingham was present on the first half of the trip, leaving at Menominee, where Mr. F. Gardner Legg joined the party and completed the tour. The car was also open every day of the Western Michigan Fair at Grand Rapids and Mr. Bingham had charge of the sanitary exhibit during that week.

As the train was conducted upon a predetermined schedule and the time allotted to each station was limited to a comparatively short period, it was, of course, impossible to make a very thorough investigation of the sanitary conditions in each locality. The engineers made it a point to get in touch, when possible, with the Health Officers and the Mayors or Presidents of the various communities and to find out if they had in mind any problems upon which a sanitarian's advice was desired. In every case, where time would permit, the public water supply station, sewage disposal works or sewer outlets were visited, pictures taken and notes made as to the con-

ditions found. In many instances valuable suggestions with respect to remedial measures were given.

As only one engineer was present there could be no one in charge of the sanitary exhibit during the time that the outside inspections were being made. It was, therefore, highly desirable to hurry the inspections so that the engineer could spend as much time as possible in the car explaining the exhibit.

The inspectors reported that it was a noticeable fact that the average layman displayed a keener interest in questions pertaining to general sanitation than did the greater percent of the municipal officials encountered.

13. Highland Park Water Supply.—On June 28th, Highland Park discontinued its old supply which was obtained from the City of Detroit and inaugurated a new supply which is obtained from Lake St. Clair at an inlet crib 2500 feet off the shore from Grosse Pointe Farms. The villagers are now furnished with an abundant supply of water under 40 to 50 pounds working pressure, as compared with 8 to 15 pounds when using Detroit water.

A series of bacteriological tests were made by Mr. Follin during a period from June 15th to 28th, on both the raw water and on the water sterilized with liquid chlorine as it is delivered at Highland Park. These tests showed the raw water to be pure enough under ordinary conditions, though sterilization will always be employed as a safeguard.

The village of Grosse Pointe Farms should revise their sewerage system so as to intercept all their sewage and carry it to the lower end of the village. This would greatly lessen the danger of pollution in times of storm.

Now that the new water supply has been realized after many difficulties, it is hoped that the village of Highland Park will undertake to install a filtration plant and so clear up the slightly turbid water which is now furnished to the consumers.

14.—Hillsdale County Infirmary.—Plans of a small Imhoff tank with sand filters for the Hillsdale County Infirmary were approved by this office. The design was made by Mr. John J. Cox of Ann Arbor, and the plant is to be installed this season.

15. International Boundary Waters.—The investigation of the pollution of the Detroit river, by the International Joint Commission, representing the United States and Canada, had its inception, as far as active work by the Engineering Division is concerned, on Sept. 29, 1914. This is a question of very great importance to the state, but more especially to the city of Detroit and other municipalities along the St. Clair and Detroit rivers.

On Sept. 29th and 30th, a hearing was held in Detroit at which officials of Detroit, Wyandotte and Trenton expressed their opinions of existing conditions. One of the questions being investigated by the Commission is whether or not either country is allowing boundary waters to be polluted to the damage of the public health or property of the other, in violation of the treaty of January 11, 1909, between the United States and Great Britain. As a result of the hearing at Detroit, and taking into account the findings of the bacteriologists employed by the Commission during the previous summer, it was admitted by all concerned that the Detroit river is so polluted at least below the city of Detroit. It also appears that, in all probability, the pollution is so great as to cause a serious overload on filter plants which might be constructed below Detroit in the future, for the purpose of purifying Detroit river water for domestic consumption. These facts were called to the attention of the Detroit officials who seemed

impressed with the idea that it is incumbent upon them to bear their share in the expense of protecting their river against such gross pollution.

Corrective measures were not considered in detail at this hearing, but this phase of the problem will probably be taken up later. It was suggested during the meeting that possibly fine screening, followed by the disinfection of the sewage of the city of Detroit, might meet the exigencies of the case. No action was taken on this point and no very definite expressions of opinion came out in the course of the discussion.

The Secretary of the State Board of Health and the State Sanitary Engineer were both present at the hearing. A statement of the provisions of Act 98, P. A. 1913, was outlined to the Commission and an idea given them as to how the State Board of Health expects to proceed in general. The attitude likely to be taken by the Board on the Detroit river question was stated substantially as follows:

"It is believed:

1. That the river is polluted to such an extent as to be a menace to the health of municipalities below, which use the water for domestic consumption.
2. That the expense of furnishing potable water for these towns should be borne partly by Detroit and partly by the cities using the water.
3. That so far as Detroit is concerned, its sewage should be treated in such a way as not to impose an unreasonable burden on filter plants below, should any be built.
4. That some preliminary treatment which will render the sewage of Detroit capable of sterlization, to the degree outlined above, is necessary.
5. That the dry weather flow, plus such a volume as may be found necessary to include the first washing of streets, due to large storms, and all street washings from small storms, should be so treated.
6. That storm water in excess of the above may properly be discharged into the stream untreated.
7. That immediate steps should be taken by the city of Detroit to determine the probable flow necessary to be treated, the changes in the sewerage system necessary for the economic solution of the problem and what methods of preliminary treatment are best suited to prepare the sewage for efficient sterlization.
8. That the expense of experimental work of an extensive character, under actual working conditions, would be justifiable as an economic aid to the solution of the problem."

16. Ironwood Water Supply.—The filtration Plant of the Ironwood Water Company, was inspected by Mr. H. G. McGee and a complete report was submitted to Dr. Burkart on May 29, 1915. The investigation shows that the plant is lacking in a number of important devices designed to insure efficient operation. The vital statistics of the city show, however, that the quality of the effluent in the immediate past has been probably such as to have been safe from a sanitary standpoint. In the case of seriously contaminated raw water there surely would be some question as to the efficiency of this plant. The officials of the company have been advised concerning what improvements are necessary to the proper control and efficiency of the plant and have assured us that our recommendations will have their attention.

17. Lapeer Sewage Disposal at the Michigan Home and Training School.—In 1907, a design for sewage disposal was made by an engineer outside the state for the Michigan Home and Training School. The works were built

in substantial conformity with the plans. At the time of design reliable information on the subject was not as general as now, and probably the engineer was not thoroughly conversant with proper rates in septic tanks and filters. At any rate the works are entirely inadequate to care for the needs of the institution and can only be operated at considerable expense of time and labor and even then do not give results at all satisfactory. We have made complete surveys and prepared plans for a thorough overhauling of the plant. The most serious mistake in the design was the placing of the installation so low as to be subjected to flooding by high water for a considerable time each spring.

18. Marlette Sewerage.—On May 29, 1915, a hearing was accorded the officials of the village of Marlette, and the complainants against the conditions of the Duff drain into which nearly all of the sewage of the village is discharged untreated. As a result, it was agreed that the solution most consistent with all the circumstances would be the construction of a sewer large enough for the dry weather flow from the end of the present pipes far enough down stream to remove the nuisance to a point where it would not be likely to cause complaint. Plans have been prepared and grades given for the work. Its early completion is expected.

19. Norway Water Supply.—Norway obtains its water supply from Lake Forest, a small body of water only about 28 acres in area. This lake is connected by a ditch about 500 feet long to Lake Fumee which has an area of about 485 acres. The two lakes supply the city. The quality of this water has been good until about six months ago. Last summer work was resumed on an old mine which had not been worked for about 30 years. Mine water is being pumped into the upper end of Lake Fumee and as about 35 men are employed underground without toilet facilities, this contaminated water has damaged the city supply. About six months elapsed before the effects of pollution traveled to the outlet of Lake Fumee about 8000 feet and through the ditch and across Lake Forest, a distance of about 1800 feet or about 9800 feet in all. The pollution of this water supply is a striking illustration of the travel of intestinal germs through quiet water. It has been recommended that hypochlorite be used as the water leaves Lake Fumee and dosing devices are being installed for that purpose.

20. Petoskey Sewage Treatment.—Upon investigation of the geological formation adjacent to the main sewer outlet at Petoskey and computation of the size of septic tank required, it was found that the necessary excavation would be largely in rock and the size so large that the expense of construction would be excessive. For these reasons we agreed to permit treatment by means of moderately fine screens provided that the outlet is extended beyond the breakwater into deep water.

21. Pontiac—Trade Wastes Disposal, Harger & Allen Rendering Works.—Since the last report the niusance created by this plant has been eliminated by action of the local board of health in suing the firm for polluting the brook. The case never came to trial and the works were closed.

22. Red Jacket Sewage Disposal.—On June 3rd, I inspected the sewage treatment serving the village of Red Jacket and a considerable population surrounding the village and situated in Calumet township. This treatment was installed in 1887 and has been in continuous operation since that date. It consists simply in distributing the flow on sandy land owned by the Calumet and Hecla Mining Company and of such a low quality as to be of little use for agricultural purposes. The continued irrigation of this

sand with sewage during all these years has materially improved the quality of the land so that now some parts of it support a luxuriant growth of vegetation. The locality is far enough from human habitation to be unobjectionable, but gives rise to odors which would not be tolerated in a thickly inhabited section. Under the circumstances I regard this method of disposal, though very crude, as sanitary, and the location is such as to form an ideal spot for systematic treatment, if the necessity should arise in the future.

23. Saginaw Water Supply. — The city of Saginaw again voted on the question of an improved water supply and defeated the proposition by 52 votes.

24. Sewerage Screens.—In view of the proposal of fine screening for use at Detroit, the State Sanitary Engineer was given permission by the Board of State Auditors to visit Baltimore, Md., and Brockton, Mass., for the purpose of observing and investigating the operation of fine screens in those cities.

It is becoming customary among engineers to speak of screens having openings less than three-eighths inches wide as "fine screens." Rough or coarse screens in the form of parallel bars placed one and one-half to two inches apart have been in common use for some time for the removal of the grosser floating solids in sewage. This has been done to assist in subsequent operations of treatment or to protect pumps. No attempt has been made to design coarse screens so as to reduce the organic content of sewage to any great extent. It has been proposed recently in this country to develop the efficiency of fine screens in removal of organic matter to such a point as would place them in competition with the various sedimentation schemes. This idea arose from the results obtained abroad and in a few places in the United States. To reach this degree of perfection the sewage must be passed through a wire mesh cloth having from ten to forty wires per lineal inch. As might have been expected, much trouble has been experienced with the clogging of these very fine screens, particularly from the accumulations of grease. This has resulted in serious difficulties of operation in many instances and is a serious obstacle to their adoption. In fact, the use of fine screens in this country cannot be considered to have passed the experimental stage and their adoption on works of a large scale should be attended with great caution. At Brockton, the results are far from satisfactory and at Baltimore, the apparatus has been entirely rebuilt to remedy defects of design. The results are better than at Brockton, but no quantitative determinations have been made on which to base an opinion of their efficiency.

Undoubtedly fine screening has its proper place in sewage treatment but the limitations of the process are not yet well defined. In all probability, it will be found too uncertain, in regard to both operation and results, for adoption as a method of solving the whole problem at Detroit.

25. Sturgis Sewage Disposal.—The sewage disposal works at Sturgis were put into operation in December, 1912. The plant comprises two septic tanks and three horizontal flow crushed stone filters from which the effluent flows into a county ditch.

During the first year of operation when the sewage flow was small, the plant worked satisfactorily but conditions grew gradually worse and the filters clogged badly at the inlet end, necessitating the removal of the crushed stone filtering medium at this place. This large accumulation of solids in the filters is due to the sludging up of the tanks and the consequent

carrying over of decomposed solids. This, together with the improper design of the filter beds, throws a heavy burden on the front face of the stone beds. Part of the sludge was pumped out on June 11th and the department has made some recommendations to the manager concerning the proper operation of the plant.

26. Tannery Waste Disposal.—During August, September and October, 1914, the experiments with the treatment of the wastes from the Michigan Tannery of the Wallin Leather Company at Mill Creek were renewed and extended to include sedimentation in septic tanks and filtration through sand beds, and during part of the time, treatment by contact and trickling filters. Analytical examinations of the results obtained were not possible, but certain information was obtained in regard to working rates for sand filters.

The development of septic action in the septic tank during this experimentation suggested the advisability of installing a deep tank of the Imhoff type to test out the digestion of the tannery sludge under more favorable conditions, particularly as to greater depth of water cover. A tank 30 feet deep with a sedimentation compartment of 540 gallons capacity and a sludge compartment of 40 cubic feet was installed in the spring of 1915, but has not been operated a sufficient length of time to allow any conclusions to be drawn as to its success in handling these tannery wastes.

27. Zeeland Sewerage and Sewage Disposal.—The sewer system of Zeeland has been completed and house connections are being made rapidly. Part of the treatment works are in service and the remainder well under way. The plant should be completed within a month. The treatment will consist of septic tank and sand filters, the effluent being discharged into a drainage ditch.

Respectfully submitted,
EDWARD D. RICH,
State Sanitary Engineer.

TABLE NO. 1.—*Municipalities whose question sheets on Public Water supply have been accepted to June 30, 1915.*

Addison*
Adrian (P.)
Ahmeek*
Akron
Albion
Allegan
Alpena
Applegate*
Armada
Ashley*
Athens
Au Gres*
Augusta*
Au Sable*
Bangor
Baldwin*
Bancroft
Baroda*
Barryton*
Battle Creek
Bay City
Bear Lake*
Beaverton
Belding
Bellaire (P.)
Belleville°
Bellevue*
Benton Harbor.
Berrien Springs
Bessemer
Big Rapids
Birmingham
Blissfield*
Bloomingdale*
Boardman*
Boyne City
Breedsville*
Brighton*
Britton*
Bronson*
Brown City
Buckley
Burr Oak*
Cadillac (P.)
Caledonia*
Camden*
Carleton*
Carson City
Carsonville
Caseville*
Casnovia*
Cedar Springs
Central Lake (P.)
Centreville (P.)
Charlotte
Chesaning
Clare
Clarkston
Clayton*
Clifford*
Climax*
Clinton** (P.)
Coldwater
Coleman
Colon*
Coloma
Columbiaville
Concord*
Constantine
Coopersville
Copemish*
Corunna
Croswell
Crystal Falls
Custer*
Daggett*
Dansville*
Davison*
Decatur
Deckerville
Dexter*
Dimondale*
Douglas*
Dowagiac
Dryden*
Durand
Eagle*
East Grand Rapids
East Jordan
East Lansing
East Tawas
Eaton Rapids
Edwardsburg*
Elberta*
Elkton
Elsie*
Emmett*
Empire
Escanaba (P.)
Essexville
Evart
Fairgrove*
Farmington
Farwell
Fenton
Fife Lake*
Flint
Flushing
Ford (P.)
Forestville*
Fountain*
Fowler**
Fowlerville
Frankenmuth*
Frankfort
Frazer*
Freeport*
Fremont
Gagetown
Galesburg
Galien*
Garden*
Gaylord
Gladstone
Gobleville*
Grand Haven
Grand Ledge
Grand Rapids
Grandville
Grant*
Grayling (P.)
Greenville
Grosse Pointe Shores
Hamtramck
Hancock
Harbor Beach
Harbor Springs
Harrietta*
Harrisville*
Hartford
Hastings
Hersey*
Highland Park
Hillman
Hillsdale
Holland
Holly
Homer
Houghton
Howell
Howard City
Hubbell
Imlay City
Ionia
Iron Mountain (P.)
Iron River
Ironwood (P.)
Ishpeming
Ithaca
Jackson
Jonesville
Kalamazoo
Kalkaska
Kent City*
Kinde*
Kingsley
Kingston
Laingsburg*
Lake Odessa
Lake View*
L'Anse
Lansing
Lapeer
Laurium
Lawrence
Lawton
Leonard*
Leroy*
Leslie
Lincoln*
Litchfield*
Lowell (P.)
Ludington
Luther*
Lyons
Mackinaw City*
Mancelona
Manistee
Manistique
Manton
Maple Rapids*
Marcellus
Marine City
Marion*
Marlborough
Marlette
Marquette
Marshall
Mason
Maybee*
Mayville
McBain*
McBride*
Mecosta*
Melvin*
Mendon*
Menominee (P.)
Mesick*
Metamora*
Middleville*
Mikado*
Milan
Milford
Millersburg*
Millington
Minden City*
Montgomery
Montague
Montrose*
Morenci
Morley*
Morrice*
Mt. Morris*
Muir*
Mulliken*
Munising
Muskegon
Muskegon Heights
Nashville
Negaunee
New Baltimore
Newaygo
Newberry
New Buffalo*
New Haven
Niles, P. & M.
North Adams*
North Branch*
North Muskegon
Northport*
Northville
Norway
Oakley*
Oakwood
Olivet
Omer*
Onaway
Onekama*
Onsted*
Ontonagon
Ortonville*
Oscoda
Otisville*
Otter Lake*
Ovid
Owendale*
Owosso
Oxford
Parma*
Paw Paw
Peck*
Pentwater
Perrinton*
Perry
Petoskey
Pewamo
Pierson*
Pigeon
Pinckney*
Pinconning (P.)
Plainwell
Pontiac
Port Austin
Port Hope*
Port Huron
Portland
Port Sanilac*
Posen*
Potterville*
Quincy
Reading
Redford*
Reed City
Reese*
Richland*
Richmond
River Rouge
Rochester
Rogers*
Romeo
Roscommon
Rose City*
Royal Oak
Saginaw
Saline
Sand Lake*
Sandusky
Saranac
Saugatuck
Sault Ste. Marie
Schoolcraft*
Schoolcraft, Wayne Co., (P.)
Scottville
Sebewaing
Shepherd
Sheridan
Sherman*
Sherwood*
South Haven
South Lyon*
Sparta
Spring Lake
Springport*
Stambaugh
Standish***
Stanton
Stanwood*
St. Clair
St. Charles
Stephenson*
Stevensville*
St. Ignace
St. Johns
St. Joseph
Sturgis
Sunfield*
Suttons Bay

TABLE No. 1.—*Continued.*

Tawas City	Vandalia*	Westlawn, Wayne Co., (P.)	*No system
Tecumseh	Vermontville*	Westphalia	**Not used for domestic purposes.
Tekonsha	Vassar	White Pigeon*	***Fire protection only.
Thompsonville	Vernon*	Whittemore	°System contemplated.
Three Oaks	Vicksburg	Wolverine	(P.) Privately owned.
Three Rivers	Wakefield	Woodland	
Tower*	Waldron	Wyandotte	
Traverse City	Walkerville*	Yale	Total..... 362
Tustin	Watervliet	Ypsilanti	No system..... 133
Ubly	Wayland	Zeeland	Privately owned.... 17
Union City	Wayne		
Utica*	West Branch		

TABLE NO. 2.—*Municipalities whose plans on public water supply have been accepted to June 30, 1915.*

Athens	Fowlerville	Ludington	Royal Oak
Bad Axe	Fremont	Mancelona	Romeo
Bay City	Gaylord	Manistee	Saginaw
Battle Creek	Gladstone	Manistique	Sandusky
Beaverton	Grand Rapids	Manton	Schoolcraft, Wayne Co.
Belding	Grandville	Marcellus	South Haven
Bellaire	Grayling	Marine City	Sparta
Benton Harbor	Greenville	Marlette	Spring Lake
Berrien Springs	Hancock	Marshall	Stanton
Big Rapids	Harbor Beach	Mason	St. Ignace
Boyne City	Harbor Springs	Monroe	St. Johns
Bronson	Hart	Morenci	St. Joseph
Brown City	Highland Park	Muskegon	Scottville
Carson City	Hillsdale	Muskegon Heights	Suttons Bay
Carsonville	Holland	Nashville	Three Oaks
Cassopolis	Holly	Negaunee	Thompsonville
Cedar Springs	Homer	Newaygo	Traverse City
Charlotte	Houghton	New Baltimore	Ubly
Cheboygan	Howard City	Newberry	Union City
Chesaning	Hubbell	Norway	Vassar
Clare	Imlay City	Oakwood	Vicksburg
Coldwater	Ionia	Olivet	Wakefield
Columbiaville	Iron Mountain	Ontonagon	Watervliet
Constantine	Iron River	Ovid	Wayne
Coopersville	Ironwood	Owosso	West Branch
Corunna	Ishpeming	Paw Paw	Westlawn, Wayne Co.
Croswell	Ithaca	Pentwater	Woodland
Crystal Falls	Jonesville	Perry	Wyandotte
Dowagiac	Kalamazoo	Pinconning	Yale
East Jordan	Kalkaska	Plainwell	Ypsilanti
East Lansing	Kingsley	Portland	Zeeland
Eaton Rapids	Kingston	Port Huron	
Essexville	Lake Odessa	Quincy	
Farmington	L'Anse	Reed City	Total..... 139
Farwell	Lapeer	River Rouge	
Flint	Lowell	Rockford	

TABLE NO. 3.—*Municipalities from which no reply on Public water supply was received to June 30, 1915.*

Clio	Ecorse	Hesperia*	Trenton*
East Lake*	Grass Lake	Lexington*	
Eau Claire*	Grosse Pointe	Pellston	Total..... 10

*No reply on water or sewers.

TABLE NO. 4.—*Municipalities using hypochlorite method for sterilizing their public water supply to June 30, 1915.*

Alpena	Escanaba*	Grosse Pte. Park (liquid chlorine)	South Haven
Ann Arbor (liquid chlorine)	Flint*	Ludington	St. Clair
Battle Creek (liquid chlorine)	Gladstone	Marine City	St. Joseph
Dearborn*	Grand Rapids*	Marquette	Traverse City
Detroit	Grand Rapids Hydraulic Co. (liquid chlorine)	Menominee	Wyandotte
East Gd. Rapids (liquid chlorine)	Highland Park (liquid chlorine)	Munising	Zeeland
		Norway*	Total..... 26
		Port Huron	

*Adjunct to filtration.

TABLE NO. 5.—*Municipalities using filtration system for purifying their public water supply to June 30, 1915.*

Adrian	Escanaba	Flint	Ironwood
Dearborn	Grand Rapids		

TABLE NO. 6.—*Municipalities whose question sheets on sewerage and sewage disposal have been accepted to June 30, 1915.*

Addison**
Adrian
Ahmeek
Akron*
Alpena
Ann Arbor
Ashley
Athens*
Augusta*
Baldwin*
Bancroft**
Baraga
Baroda
Barryton*
Bay City
Bear Lake
Beaverton
Belding
Bellaire*
Belleville
Bellevue
Benton Harbor
Benzonia*
Berrien Springs*
Bessemer
Blissfield*
Boardman*
Boyne City
Boyne Falls*
Breckenridge*
Breedsville*
Brighton*
Britton*
Bronson**
Brown City
Buckley
Burr Oak*
Byron**
Cadillac
Caledonia
Camden*
Caro
Carson City
Carsonville
Caseville*
Cassopolis
Cedar Springs*
Central Lake*
Centreville*
Charlotte
Chesaning
Clare
Clayton*
Clifford**
Climax*
Clio*
Coldwater
Coleman**
Coloma*
Colon*
Columbiaville*
Concord*
Constantine
Coopersville
Copemish*
Corunna
Croswell
Crystal Falls
Custer
Daggett*
Dansville*
Davison
Decatur*
Detour
Detroit
Dexter*
Dimondale*
Dowagiac
Dryden*
Durand
Eagle*
East Jordan
East Lansing
Eaton Rapids
Edmore*
Edwardsburg*
Elberta*
Elkton*
Elsie*
Empire*
Escanaba
Essexville
Evart
Fairgrove*
Farmington
Farwell
Fennville*
Fife Lake*
Flint
Flushing°
Ford
Forestville*
Fountain*
Fowler*
Fowlerville**
Frankenmuth
Frazer
Freeport*
Fremont
Fruitport
Gagetown*
Gaines
Galesburg*
Galien*
Garden*
Gaylord*
Gladstone
Gobleville*
Grand Haven
Grand Ledge
Grand Rapids
Grandville*
Grant*
Grass Lake°
Greenville
Grosse Pointe Shores°
Hancock
Harrietta*
Harrison*
Harrisville**
Hartford*
Hersey*
Highland Park
Hillman
Hillsdale
Holland
Holly
Homer
Houghton
Howard City
Howell
Hubbell
Imlay City* (***)
Ionia
Iron Mountain
Iron River
Ishpeming
Jonesville
Kalamazoo
Kalkaska*
Kent City*
Kingsley**
Kingston*
L'Anse*
Laingsburg*
Lake Odessa*
Lakeview*
Lapeer
Laurium
Lawrence
Lawton
Leroy*
Leslie
Lincoln*
Lowell
Ludington
Luther*
Lyons**
Mackinaw City*
Mancelona*
Manistee
Manistique
Manton*
Maple Rapids*
Marcellus*
Marion°
Marine City
Marlborough*
Marshall
McBain*
McBride*
Mecosta*
Melvin*
Mendon
Menominee
Mesick*
Metamora*
Middleville*
Mikado*
Milford*
Millersburg**
Monroe
Montague*
Montgomery**
Montrose*
Morenci
Morley*
Morrice*
Mulliken
Muir
Munising
Muskegon
Nashville
Negaunee
Newaygo
New Baltimore**
Newberry
New Buffalo**
New Haven
North Branch
North Muskegon*
Northport°
Norway
Oakley*
Oakwood
Olivet*
Onaway*
Onekama*
Onsted*
Ontonagon
Ortonville*
Oscoda°
Otsego
Otter Lake
Ovid**
Owendale
Owosso
Parma**
Paw Paw
Peck*
Pellston*
Pentwater
Perrinton
Perry*
Petoskey
Pewamo*
Pierson*
Pigeon**
Pinckney*
Pinconning
Plainwell
Pontiac
Port Austin**
Port Hope**
Portland
Port Sanilac*
Posen
Potterville*
Quincy
Reading
Redford*
Reed City
Reading
Reese*
Richland*
Richmond
River Rouge
Rochester
Rogers
Romeo
Roscommon*
Rose City
Royal Oak
Saginaw
Saline
Sand Lake
Sandusky
Saranac*
Saugatuck*
Schoolcraft*
Scottville
Sebewaing**
Sheridan**
Sherwood*
South Haven
South Lyon**
Sparta
Spring Lake***
Springport*
Standish
Stanton
Stanwood*
St. Clair
St. Charles*
Stephenson*
Stevensville*
St. Johns
St. Joseph
Sturgis
Sunfield*
Suttons Bay
Tawas City*
Tecumseh
Tekonsha**
Thompsonville
Three Rivers
Three Oaks
Tower*
Traverse City
Tustin*
Ubly**
Union City
Utica*
Vandalia*
Vanderbilt*
Vermontville*
Vernon*
Vicksburg*
Waldron*
Walkerville**
Watervliet°
Wayland*
Wayne
West Branch
Westphalia
White Cloud
White Pigeon
Whittemore
Williamston
Wolverine*

TABLE NO. 6.—*Continued.*

Woodland*	Zeeland	***System contemplated.....	2	Total.....	324
Wyandotte		°Private sewers.....	8		
Yale	*No system..... 136				
Ypsilanti	**Storm sewers only. 28				

TABLE NO. 7.—*Municipalities whose maps and plans for sewerage and sewage disposal have been accepted to June 30, 1915.*

Adrian	Eaton Rapids	Jonesville	Plainwell	
Ahmeek	Essexville	Kalamazoo	Portland	
Alpena	Farmington	Lapeer	Reading	
Battle Creek	Farwell	Laurium	Rockford	
Bay City	Fenton	Lawrence	Romeo	
Beaverton	Flint	Lowell	Rose City	
Belding	Ford	Ludington	Scottville	
Big Rapids	Frazer	Manistee	South Haven	
Bloomingdale	Fremont	Manistique	Sparta	
Brown City	Gladstone	Marshall	Stanton	
Carson City	Grand Haven	Menominee	St. Johns	
Carsonville	Grand Ledge	Monroe	St. Joseph	
Charlotte	Grand Rapids	Muskegon	Sturgis	
Cheboygan	Hancock	Nashville	Suttons Bay	
Clare	Harbor Springs	Negaunee	Three Oaks	
Coldwater	Highland Park	Newaygo	Three Rivers	
Constantine	Hillsdale	Newberry	Traverse City	
Coopersville	Holland	North Branch	Vicksburg	
Corunna	Houghton	Norway	Wayne	
Croswell	Howard City	Oakwood	Yale	
Crystal Falls	Howell	Ontonagon	Ypsilanti	
Davison	Hubbell	Otsego	Zeeland	
Detroit	Imlay City	Owosso		
Dowagiac	Ionia	Paw Paw		
East Jordan	Iron River	Pentwater	Total.....	100
East Lansing	Ishpeming	Pinconning		

TABLE NO. 8.—*Municipalities from whom no reply was received on sewerage and sewage disposal to June 30, 1915.*

East Lake*	Leonard	Orion		
Eau Claire*	Lexington*	Trenton*	Total.....	8
Hesperia*	Memphis			

*No reply on water or sewers—5.

TABLE NO. 9.—*Municipalities having sewage disposal works in operation, so far as known at the present time.*

Cadillac	Fremont	North Branch	Zeeland (under construction)	
Caro	Hancock	Petoskey		
Charlevoix	Ithaca	Red Jacket		
Coldwater	Jackson	St. Johns	Total.....	16
Durand	Lawrence	Sturgis		

TABLE NO. 9.—Continued.—*Municipalities contemplating changes or new installations of sewage disposal works.*

Alma	East Grand Rapids	Hastings	Petoskey	
Bad Axe	Grand Rapids	Howell	Reading	
Birmingham	Harbor Beach	Mason	Three Oaks	
Cadillac	Harbor Springs	North Branch (under construction)		
Coopersville	Hartford		Total.....	18
Detroit				

TABLE NO. 10.—*Plans and specifications for State Buildings recommended for approval by the State Sanitary Engineer from June 30, 1914, to June 30, 1915.*

Aug. 20, 1914—Michigan Home and Training School, Lapeer. Plans for new hospital.
May 20, 1915—Michigan Soldiers' Home—Nurses' dormitory—Grand Rapids.
May 25, 1915—Michigan Farm Colony for Epileptics—office building—Wahjamega.
May 31, 1915—*Traverse City State Hospital—new dining room.
June 19, 1915—Michigan Home and Training School—girls' cottage—Lapeer.
June 28, 1915—Employment Institution for Blind—superintendent's residence—Saginaw.

Total—6.

*Approval withheld pending receipt of complete plans.

TABLE NO. 11.—*Sanitary inspections and consultations made from June 30, 1914, to June 30, 1915.*

Location.	Date.	Subject.	Engineer.
Adrian	Mar. 4,1915	Water purification plant	H. M. McGee.
Ahmeek	June 2,1915	Inspection, proposed water supply	E. D. Rich.
Alma	July 6,1914	Sewage disposal	E. D. Rich.
Almont	Mar. 29,1915	School house sanitation	D. W. Bingham.
Alpena	Feb. 15–16, 1915	Typhoid epidemic	H. L. McGee.
Alpena	Mar. 16–25, 1915	Water supply in regard to typhoid fever	H. L. McGee.
Alpena	May 14,1915	Conference with the mayor regarding water purification	E. D. Rich.
Ann Arbor	Dec. 16–23, 1914	Work for Michigan Eugenic Commission	D. W. Bingham.
Ann Arbor	Jan. 19–20, 1915	Michigan Engineering Society	H. L. McGee.
Ann Arbor	Jan. 20,1915	Read paper before Michigan Eng. Society on work of International Joint Commission on boundary waters	F. G. Legg.
Ann Arbor	Jan. 20,1915	Meeting of Michigan Eng. Society	D. W. Bingham.
Ann Arbor	Mar. 20,1915	Conference with Prof. Hoad and John Cox on sewage disposal	E. D. Rich.
Ann Arbor	April 24, 1915.	Conference with Prof. C. T. Johnston on sewage disposal	E. D. Rich.
Ann Arbor	June 24,1915	Conference with Prof. Hoad on sewage disposal for Grand Rapids	E. D. Rich.
Auburn	Mar. 24,1915	Public address on rural sanitation	F. G. Legg.
Bailey Lake	Jan. 21,1915	Ice inspection	D. W. Bingham.
Bancroft	Aug. 28,1914	Water supply	D. W. Bingham.
Battle Creek	Nov. 9,1914	Inspection of new water works and liquid chlorine apparatus at old works	E. D. Rich.
Battle Creek	Dec. 18,1914	Inspection of liquid chlorine apparatus with officials of East Grand Rapids	E. D. Rich.
Bay View	Aug. 13,1914	Sewage disposal	E. D. Rich.
Berrien Springs	Mar. 4,1915	Conference and inspection of Emanuel Missionary College disposal works	E. D. Rich.
Birmingham	June 5,1915	Private sewage disposal	D. W. Bingham.
Bloomingdale	July 7,1914	School sanitation	D. W. Bingham.
Bloomingdale	Jan. 12,1915	School house inspection	E. D. Rich.
Boyne City	July 27,1914	General sanitary conference	F. G. Legg.
Boyne City	June 9,1915	Sewage disposal	F. G. Legg.
Breckenridge	Mar. 18,1915	Typhoid fever investigation	D. W. Bingham.
Bridgman	Oct. 10,1914	Sewage disposal	D. W. Bingham.
Bronson	July 4,1914	Sewage disposal	F. G. Legg.
Buchanan	Oct. 9,1914	Nuisance	D. W. Bingham.
Cadillac	July 31,1914	Water supply	E. D. Rich.
Caledonia	Aug. 17,1914	Sewage nuisance	E. D. Rich.
Caledonia	Dec. 2,1914	Sewage disposal	D. W. Bingham.
Capac	July 21,1914	Stream pollution nuisance	E. D. Rich.
Capac	July 25,1914	Trade wastes disposal	D. W. Bingham.
Caro	April 23,1915	Inspection, sewage disposal works	E. D. Rich.
Caro	April 23,1915	Sewage disposal	F. G. Legg.
Caro	May 6,1915	Sewage disposal and inspection of septic tank cleaning	E. D. Rich.
Cass Lake	Aug. 31,1914	Resort sanitation	D. W. Bingham.
Charlevoix	Dec. 28,1914	Submission of plans on sewage disposal	D. W. Bingham.
Chicago, Ill	Mar. 18,1915	Investigation of sewage disposal and sewage tests	E. D. Rich.
Chippewa Twp., Isabella Co	Sept. 24,1914	Drain nuisance	F. G. Legg.
Clio	Oct. 27,1914	Milk condensary works inspection	D. W. Bingham.
Clio	Jan. 5,1915	Creamery wastes disposal	D. W. Bingham.
Coldwater	July 5,1914	Sewage disposal	F. G. Legg.

TABLE NO. 11.—*Continued.*

Location.	Date.	Subject.	Engineer.
Coldwater	May 4, 1915	Sewage disposal	F. G. Legg.
Coldwater	May 4, 1915	Sewage disposal	E. D. Rich.
Croswell	Nov. 17, 1914	Inspection of wastes disposal from sugar company and the condition of Black River due to the same	E. D. Rich.
Dansville	Dec. 7, 1914	School house inspection	F. G. Legg.
Dearborn	Jan. 23, 1915	Inspection of water filtration plant	E. D. Rich.
Dearborn	Jan. 22, 1915	Water purification plant	H. L. McGee.
Delta Twp., Ingham county	Aug. 20, 1914	Slaughter house nuisance	D. W. Bingham.
Detroit	Sept. 29–30, 1914	Conference with International Commission on Pollution of boundary waters	E. D. Rich.
Detroit	Nov. 10, 1914	Hearing of International Joint Commission on stream pollution	E. D. Rich.
Detroit	Nov. 10, 1914	Meeting of International Joint Commission on pollution of streams	D. W. Bingham.
Detroit	Nov. 16, 1914	Conference regarding Detroit Reduction Works at French Landing	E. D. Rich.
Detroit	Dec. 21, 1914	Inspection of apparatus used by National Pure Water Co., for treating water	E. D. Rich.
Detroit	Dec. 21, 1914	Conference with village president of Dearborn regarding plans for water and sewers	E. D. Rich.
Detroit	Jan. 9, 1915	Conference on water supply and sewage disposal for Westlawn sub-division, Greenfield Twp	D. W. Bingham.
Detroit	Jan. 20, 1915	Conference regarding sewage disposal for Y. W. C. A. cottage at Orion	D. W. Bingham.
Detroit	Jan. 18, 1915	Ice inspection	D. W. Bingham.
Detroit	Jan. 19, 1915	Ice inspection	D. W. Bingham.
Detroit	Jan. 25, 1915	Conference on sewage disposal for Ford Republic, Farmington	D. W. Bingham.
Detroit	Jan. 23, 1915	Ice inspection	D. W. Bingham.
Detroit	Feb. 15, 1915	Address before Wayne County Medical Society on water purification	E. D. Rich.
Detroit	Feb. 16, 1915	Conference with Thos. Leisen on Detroit water supply and with R. K. Davis on garbage disposal	E. D. Rich.
Detroit	April 24, 1915	Conference with C. W. Hubbell and city council on sewage disposal. Conference with R. K. Davis on garbage disposal	E. D. Rich.
Detroit	May 22, 1915	Conference with Detroit Water Board regarding submission of plans	D. W. Bingham.
Detroit	June 4, 1915	Conference with M. L. Brown & Son regarding submission of plans for Grosse Pt. Park and for Grosse Pointe	D. W. Bingham.
Douglas Lake	Aug. 13, 1914	Resort sanitation at University of Michigan Engineering Camp	E. D. Rich.
East Gd. Rapids	April 27, 1915	Inspection of plans for sewage disposal and address to citizens on sewage disposal	E. D. Rich.
East Gd. Rapids	June 20, 1915	Water supply	J. W. Follin.
East Lansing	Oct. 16, 1914	Well pollution	F. G. Legg.
East Lansing	May 26, 1915	Address M. A. C. on sewage disposal	E. D. Rich.
Ecorse	Jan. 14, 1915	Ice inspection	D. W. Bingham.
Ecorse	Jan. 16, 1915	Ice inspection	D. W. Bingham.
Edmore	Sept. 22, 1914	Sewerage	E. D. Rich.
Erie	Sept. 1, 1914	Resort sanitation	D. W. Bingham.
Escanaba	Mar. 25, 1915	Inspection of water supply	E. D. Rich.
Fair Haven Mills	Jan. 15, 1915	Ice inspection	D. W. Bingham.
Farmington	Jan. 24, 1915	Sewage disposal for Ford Republic	D. W. Bingham.
Farwell	Sept. 29, 1914	School inspection and sewage conference	F. G. Legg.
Fenton	Sept. 3, 1914	Sewerage	F. G. Legg.
Flint	Jan. 5, 1915	Sewage disposal at Genesee County Infirmary	D. W. Bingham.
Flint	Jan. 23, 1915	Inspection of water filtration	E. D. Rich.

TABLE NO. 11.—*Continued.*

Location.	Date.	Subject.	Engineer.
Flint	Jan. 23,1915	Water purification plant	H. L. McGee.
Flint (Long Lake)	June 2,1915	Sewage disposal and resort sanitation	F. G. Legg.
Flushing	Aug. 3,1914	Water supply	E. D. Rich.
Ford	Jan. 14,1915	Ice inspection	D. W. Bingham.
Ford	Jan. 16,1915	Ice inspection	D. W. Bingham.
Fremont	Aug. 1,1914	Sewerage	E. D. Rich.
Fremont	Aug. 8,1914	Canning factory wastes disposal	Albert Roth.
Fremont	Sept. 8–28 1914	Canning factory wastes disposal	Albert Roth.
French Landing	Mar. 29,1915	Garbage reduction inspection	E. D. Rich.
Galesburg	Oct. 9,1914	Schoolhouse ventilation	D. W. Bingham.
Galesburg	Dec. 1,1914	School house ventilation	D. W. Bingham.
Gaylord	Jan. 13,1914	School house inspection	F. G. Legg.
Gladstone	April 20–21, 1914	Purity of water supply	H. L. McGee.
Grand Ledge	July 8,1914	Sewerage	E. D. Rich.
Grand Ledge	July 8,1914	Sewage	F. G. Legg.
Grand Rapids	July 22,1914	Tannery wastes disposal	E. D. Rich.
Grand Rapids	July 22–24, 1914	Tannery wastes experimental station	Albert Roth.
Grand Rapids	Aug. 1, 3,1914	Tannery wastes experimental station	Albert Roth.
Grand Rapids	Aug. 16, 1914	Experimental station	Albert Roth.
Grand Rapids	Aug. 22,1914	Tannery wastes experimental station	E. D. Rich.
Grand Rapids	Aug. 21–29, Sept. 3–6	Tannery wastes experimental station	Albert Roth.
Grand Rapids	Sept. 2–7, 1914	"Health First Train" at West Michigan Fair	D. W. Bingham.
Grand Rapids	Sept. 18–27, 1914	Tannery wastes experimental station	Albert Roth.
Grand Rapids	Dec. 17,1914	Consultation with city engineer and secretary of board of public works regarding sewage disposal progress at Grand Rapids	E. D. Rich.
Grand Rapids	Jan. 13,1915	Conference with Wallin Leather Company regarding tannery wastes disposal	E. D. Rich.
Grand Rapids	Jan. 25,1915	Address to council on sewage disposal	E. D. Rich.
Grand Rapids	Jan. 26,1915	Conference with Wallin Leather Conpany on tannery wastes disposal	E. D. Rich.
Grand Rapids	Feb. 7,1915	Public address on sewage disposal	E. D. Rich.
Grand Rapids	Feb. 8,1915	Address before chamber of Commerce on sewage disposal and conference with Wallin Leather Co. on tannery wastes disposal	E. D. Rich.
Grand Rapids	April 13,1915	Public address	E. D. Rich.
Grand Rapids	April 20,1915	Tannery wastes disposal	H. L. McGee.
Grand Rapids	May 18,1915	Tannery wastes disposal	H. L. McGee.
Grand Rapids	June 3,4,8 1915	Experimental station at Wallin Leather Co	J. W. Follin.
Grand Rapids	June 12,1915	Experimental station at Wallin Leather Co	J. W. Follin.
Grand Rapids	June 19,1915	Experimental station at Wallin Leather Co	J. W. Follin.
Grand Rapids	June 20,1915	Inspection of G. R. Hydraulic Co.'s plant	J. W. Follin.
Grand Rapids	June 30,1915	Experimental station at Wallin Leather Co	J. W. Follin.
Grandville	Nov. 9,1914	Inspection of septic tank	F. G. Legg.
Grandville	Feb. 6,1915	Sewerage for school house	E. D. Rich.
Grandville	May 10,1915	Water supply protection and sewage disposal	F. G. Legg.
Grayling	Jan. 14,1915	Sanitary inspection regarding sewers and water supply	F. G. Legg.
Greenfield Twp., Wayne Co.	May 14,1915	Investigation of nuisance and general sanitation	D. W. Bingham.
Greenfield Twp., Wayne Co.	June 14,1915	Sewage disposal for school district No. 2	D. W. Bingham.
Grosse Pt. Park	Jan. 18,1915	Ice inspection	D. W. Bingham.
Hamtramck	May 22,1915	Smoke nuisance	D. W. Bingham.
Harbor Beach	Oct. 29,1914	Sewerage	F. G. Legg.
Harbor Springs	Nov. 10,1914	Sewerage	F. G. Legg.
Harbor Springs	Mar. 26,1915	Conference on sewage disposal	E. D. Rich.
Hartford	Mar. 5,1915	Conference on sewage disposal	E. D. Rich.
Haslett	Sept. 1,1914	Stockyard nuisance	Albert Roth.

TABLE NO. 11.—*Continued.*

Location.	Date.	Subject.	Engineer.
Hastings	Nov. 16,1914	Purity of proposed water supply	F. G. Legg.
Hemlock	July 1,1914	Sewage disposal	D. W. Bingham.
Highland Park	Aug. 31,1914	Sewage disposal	D. W. Bingham.
Highland Park	June 15,16, 17,18,21,22, 24,25,26,28, 1915	Investigation of new water supply	J. W. Follin.
Hillsdale	June 25,1915	Sewage disposal at County Infirmary	F. G. Legg.
Holland Twp., Isabella county	Sept. 25,1914	Drain conference	F. G. Legg.
Holton	May 20,1915	Sewerage and sewage disposal	H. L. McGee.
Howell	Dec. 10,1914	Slaughter house nuisance	D. W. Bingham.
Iron Mountain	Aug. 21,1914	Garbage disposal	E. D. Rich.
Ironwood	May 24,1915	Purity of water supply	H. L. McGee.
Island Lake	Jan. 13,1915	Ice inspection	D. W. Bingham.
Ithaca	Dec. 15,1914	Submission of plans—sewage disposal	D. W. Bingham.
Jackson	Aug. 4,1914	Sewerage	E. D. Rich.
Jackson	Sept. 23,1914	Sewage disposal	E. D. Rich.
Jackson	Mar. 6,1915	Sewage disposal	D. W. Bingham.
Jackson	Mar. 8,1915	Sewage disposal	D. W. Bingham.
Jackson	April 14,1915	Address on sewerage and sewage disposal	E. D. Rich.
Kalamazoo	Nov. 24,1914	Conference with C. E. Pierson regarding Traverse City sewerage	E. D. Rich.
Laingsburg	Nov. 23,1914	School house inspection and sewerage conference	F. G. Legg.
Laingsburg	Dec. 21,1914	Sewerage	F. G. Legg.
Lake Odessa	July 13,1914	Creamery nuisance	Albert Roth.
Lansing	Dec. 4,1914	Sewage nuisance	F. G. Legg.
Lansing	Feb. 15,1915	Slaughter house and reduction plant nuisance.	D. W. Bingham.
Lansing	Feb. 20,1915	Conference on Harbor Beach sewage disposal.	E. D. Rich.
Lansing	Mar. 1,1915	Inspection of insanitary plumbing	F. G. Legg.
Lansing	Mar. 6,1915	Conference with Mr. Magoon and Mr. Kennedy on water supply and sewerage for Westlawn, Wayne county	E. D. Rich.
Lansing	June 9,1915	Conference on sewage disposal for Genesee County Infirmary	E. D. Rich.
Lansing	June 11,1915	Conference on sewage disposal for school at Wayne	E. D. Rich.
Lansing	June 17,1915	Conference with R. K. Davis on garbage disposal for Detroit	E. D. Rich.
Lansing	June 25,1915	Consultation with J. R. Rumsey on sewerage for East Grand Rapids	E. D. Rich.
Lansing	June 28,1915	Conference with Fred Merry on sewage disposal for school at Gaylord	E. D. Rich.
Lansing	June 30,1915	Conference with Mr. D'Olier on sewage disposal for Grand Rapids	E. D. Rich.
Lansing	June 30,1915	Conference with Mr. Pierson on sewage disposal for Gaylord	E. D. Rich.
Lapeer	July 20–29, 1914	Sewage disposal for Mich. Home & Train. Sch.	D. W. Bingham.
Lapeer	July 21,1914	Sewerage for Mich. Home & Training School	E. D. Rich.
Lapeer	Sept. 21,22, 1914	Sewage disposal for Mich. Home & Train Sch.	F. G. Legg.
Lapeer	Sept. 21,22, 1914	Sewage disposal for Mich. Home & Train. Sch.	D. W. Bingham.
Lapeer	April 23,1915	Public address	E. D. Rich.
Lapeer	April 23,1915	Sewage disposal for Mich. Home & Train. Sch.	F. G. Legg.
Laurium	June 2,1915	Sewage disposal	E. D. Rich.
Leslie	June 28,1915	School house sanitation	D. W. Bingham.
Ludington	Feb. 4,1915	"Health Week;" two addresses on municipal sanitation	E. D. Rich.
Marlette	Oct. 7,1914	Sewage disposal	D. W. Bingham.
Marlette	Oct. 7,1914	Survey for sewage disposal	F. G. Legg.
Marlette	Feb. 3,4,5, 1915	Sewer gauging and sewage disposal	F. G. Legg.

TABLE NO. 11.—*Continued.*

Location.	Date.	Subject.	Engineer.
Marlette	Feb. 4,1915	Proposed sewage treatment	H. L. McGee.
Marlette	June 23,1915	Sewage disposal	F. G. Legg.
Marlette	June 23,24 1915	Sewerage	D. W. Bingham.
Mason	Sept. 26,1914	Slaughter house nuisance	D. W. Bingham.
Mason	Mar. 26,1915	Public address on sewerage and sewage disposal	F. G. Legg.
Mason	June 28,1915	Sewage disposal at county jail	D. W. Bingham.
Menominee	May 4,1915	Sewerage	D. W. Bingham.
Mill Creek	Sept. 7,1914	Pollution of water supply	Albert Roth.
Milligan	Oct. 8,1914	Sewerage	F. G. Legg.
Monroe	Jan. 11,1915	Drainage	D. W. Bingham.
Mulliken	July 24,1914	School house ventilation	F. G. Legg.
Muskegon	July 29,1914	Sewage disposal	F. G. Legg.
Muskegon	April 1,1915	School house inspection	E. D. Rich.
Muskegon	April 27–30, 1915	School house inspection	D. W. Bingham.
Mt. Clemens	Jan. 18,1915	Ice inspection	D. W. Bingham.
Mt. Pleasant	Oct. 16,1914	Testimony in Probate Court relative to desirability of a sewer extension	E. D. Rich.
New Baltimore	Jan. 15,1915	Ice inspection	D. W. Bingham.
North Branch	Oct. 7,1914	Sewage disposal	D. W. Bingham.
Norway	Mar. 20,1915	Water supply inspection	E. D. Rich.
Norway	May 5,6,1915	Water purification	D. W. Bingham.
Orchard Lake	June 23,1915	Sewage disposal at Polish Seminary	J. W. Follin.
Orion	Nov. 23,1914	Water supply	D. W. Bingham.
Orion	Jan. 21,1915	Sewage disposal for Y. W. C. A. cottage and ice inspection	D. W. Bingham.
Otsego	Aug. 27,1914	Water supply	D. W. Bingham.
Otter Lake	Jan. 5,1915	School house sanitation	D. W. Bingham.
Otter Lake	June 25,1915	Sewerage and investigation of nuisance	D. W. Bingham.
Paw Paw	Aug. 10,1914	Lake pollution by sewage	F. G. Legg.
Pentwater	July 28,1914	General sanitary conference	F. G. Legg.
Perrinton	May 24,1915	Creamery wastes disposal	D. W. Bingham.
Petoskey	Nov. 10,1914	Sewerage	F. G. Legg.
Pewamo	Aug. 8,1914	Creamery nuisance and general conference	F. G. Legg.
Plymouth	Aug. 10,1914	Sewerage	E. D. Rich.
Pontiac	Oct 6, 1914	Preliminary survey for experiments on rendering works wastes	F. G. Legg.
Pontiac	Oct. 6,1914	Preliminary to experiments on rendering works wastes	D. W. Bingham.
Pontiac	Oct. 20–24, 1914	Experimental work on rendering works wastes	D. W. Bingham.
Pontiac	Oct. 29,30, 31,1914	Experimental work on rendering works wastes	D. W. Bingham.
Pontiac	Nov. 5,6,1914	Experimental work on rendering works wastes	D. W. Bingham.
Pontiac	Nov. 11,1914	Inspection of the experimental work being done by Mr. Bingham at Harger's rendering works	E. D. Rich.
Pontiac	Nov. 9,10,11, 12,13,1914	Experimental work on rendering works wastes	D. W. Bingham.
Pontiac	Nov. 24,1914	Experimental work on rendering works wastes	D. W. Bingham.
Pontiac	May 11,1915	Trade wastes	D. W. Bingham.
Port Huron	May 19,1915	Public address	E. D. Rich.
Quincy	Jan. 18,1915	Consultation regarding maps of water and sewer systems	F. G. Legg.
Quincy	April 24,1915	Sewage disposal	F. G. Legg.
Quincy	April 26,1915	Conference with village council on sewage disposal	F. G. Legg.
Reading	Aug. 31,1914	Sewage disposal	D. W. Bingham.
Reading	Oct. 31,1914	Sewerage	F. G. Legg.
Reading	Nov. 2,1914	Sewerage	F. G. Legg.
Red Jacket	June 3,1915	Sewage disposal	E. D. Rich.
Reed City	Aug. 15,1914	Sewage disposal	D. W. Bingham.
River Rouge	Jan. 14,1915	Ice inspection	D. W. Bingham.
Rochester	Oct. 27,1914	General sanitary inspection	D. W. Bingham.
Roscommon	Oct. 5,1914	Sewerage	F. G. Legg.
Rosebush	Sept. 3,1914	School house ventilation	F. G. Legg.
Royal Oak	Aug. 1,1914	Typhoid fever investigation	D. W. Bingham.

TABLE NO. 11.—*Continued.*

Location.	Date.	Subject.	Engineer.
Royal Oak	Oct. 28, 1914	Sewage disposal	D. W. Bingham.
Saginaw	Sept. 30, 1914	Conference with city engineer on sewage disposal	F. G. Legg.
Saginaw	Nov. 18, 1914	Conference with city engineer relative to storm drainage in Carrollton Twp	E. D. Rich.
Salem	Sept. 1, 1914	Drainage	D. W. Bingham.
Schoolcraft, Wayne county	Nov. 24, 1914	Sewage disposal and water supply	D. W. Bingham.
Sebewaing	Mar. 5,6,1915	Public address on water supply and general sanitation	F. G. Legg.
St. Johns	Feb. 22, 1915	Inspection of sewage disposal plant	E. D. Rich.
St. Johns	June 8, 1915	Nuisance	D. W. Bingham.
St. Joseph	Aug. 5, 1914	Sewerage	E. D. Rich.
St. Joseph	Aug. 5, 1914	Summer resort sanitation	E. D. Rich.
Sturgis	Sept. 5, 1914	Local nuisance investigation and general sanitation	F. G. Legg.
Sturgis	May 3, 1915	Inspection of sewerage	E. D. Rich.
Sturgis	May 3, 1915	Sewage disposal	F. G. Legg.
Sturgis	June 10–11, 1915	Inspection of sewage disposal plant	J. W. Follin.
Three Rivers	Aug. 3, 1914	Investigation of nuisance and general conference	F. G. Legg.
Traverse City	Aug. 17, 1914	Investigation of nuisance	D. W. Bingham.
Trout Lake	June 4, 1915	Investigation of nuisance	E. D. Rich.
Wahjamega	July 20, 1914	Sewerage	E. D. Rich.
Wahjamega	Aug. 18–19, 1914	Sewerage	E. D. Rich.
Wahjamega	Aug. 31 and Sept. 1, 1914	Sewerage of state buildings	F. G. Legg.
Wahjamega	April 22, 1915	Sewage disposal and sidewalk grades at Michigan Farm Colony for Epileptics	F. G. Legg.
Wahjamega	April 22, 1915	Sewage disposal at Michigan Farm Colony for Epileptics	E. D. Rich.
Wayne	May 7, 1915	Sewage disposal for school house	E. D. Rich.
Wayne	June 4, 1915	Creamery wastes	D. W. Bingham.
Whitefish Lake	Sept. 25, 1914	Low water nuisance	F. G. Legg.
Wyandotte	Jan. 14, 1915	Ice inspection	D. W. Bingham.
Yale	Dec. 14, 1914	Sewage disposal	D. W. Bingham.
Yale	June 15, 1915	Sewerage and general sanitation	D. W. Bingham.
Zeeland	July 6, 1914	Sewage disposal	D. W. Bingham.
Zeeland	July 23, Aug. 22 Sept. 29, 1914	Cheese factory nuisance	Albert Roth.
Zeeland	April 19, 1915	Creamery nuisance	H. L. McGee.
Zeeland	May 28, 1915	Sewage disposal	E. D. Rich.
Total.... 268			

TABLE NO. 11.—Continued.—*Showing inspections made by Mr. Don W. Bingham while with the Health Train from August 3 to 13, 1914.*

Akron	General sanitation.
Alpena	Sewage disposal, water purification and general sanitation.
Bad Axe	Sewage disposal.
Bark River	General sanitation.
Capac	General sanitation.
Carsonville	General sanitation.
Croswell	General sanitation, and question sheets on sewers.
Deckerville	Sewage disposal.
Engadine	General sanitation.
Escanaba	Sewage disposal and water supply.
Gladstone	General sanitation.
Harbor Beach	Sewage disposal.
Harrisville	Sewage disposal.
Imlay City	General sanitation.
Lapeer	Sewage disposal.
Manistique	General sanitation and submission of water and sewer maps.
Onaway	General sanitation.
Port Huron	General sanitation, water purification and sewage disposal.
Powers	General sanitation.
Sebewaing	Question sheets on water and sewer systems.
Spalding	General sanitation.
Stephenson	General sanitation.
St. Ignace	Sewage disposal and general sanitation.
Tawas City	Question sheet on water and sewer systems.
Tower	Question sheets on water and sewer systems.
Trout Lake	General sanitation.
Total 26	

TABLE NO. 11.—Concluded.—*Showing inspections made by Mr. F. Gardner Legg while with the Health Train from August 13 to 30, 1914.*

Atlantic	General sanitation.
Baraga	Water supply and general sanitation.
Bergland	General sanitation.
Bessemer	Instructions on water and sewer maps.
Brimley	School sewerage.
Calumet	Sewage disposal and garbage collection.
Chassell	General sanitation.
Dollar Bay	General sanitation.
Ewen	General sanitation.
Greenland	General sanitary inspection and garbage collection.
Hancock	General sanitation and submission of maps.
Houghton	General sanitation and sewage disposal at County Tuberculosis Hospital.
Iron Mountain	Water supply, sewage disposal, garbage collection and garbage disposal.
Ishpeming	Water and sewerage, garbage collection and disposal.
Kenton	School house inspection and general sanitation.
L'Anse	General sanitation.
Lake Linden	General sanitation.
Laurium	Sewerage and garbage collection.
Marquette	Water supply, sewage disposal and garbage collection and disposal.
Michigamme	General sanitation.
Newberry	General sanitary survey.
Norway	General sanitation and submission of maps.
Painesdale	General sanitation and garbage collection.
Sidnaw	General sanitation.
Red Jacket	Sewage disposal and garbage collection.
South Range	General sanitary survey.
Trout Lake	General sanitation.
Total 27	

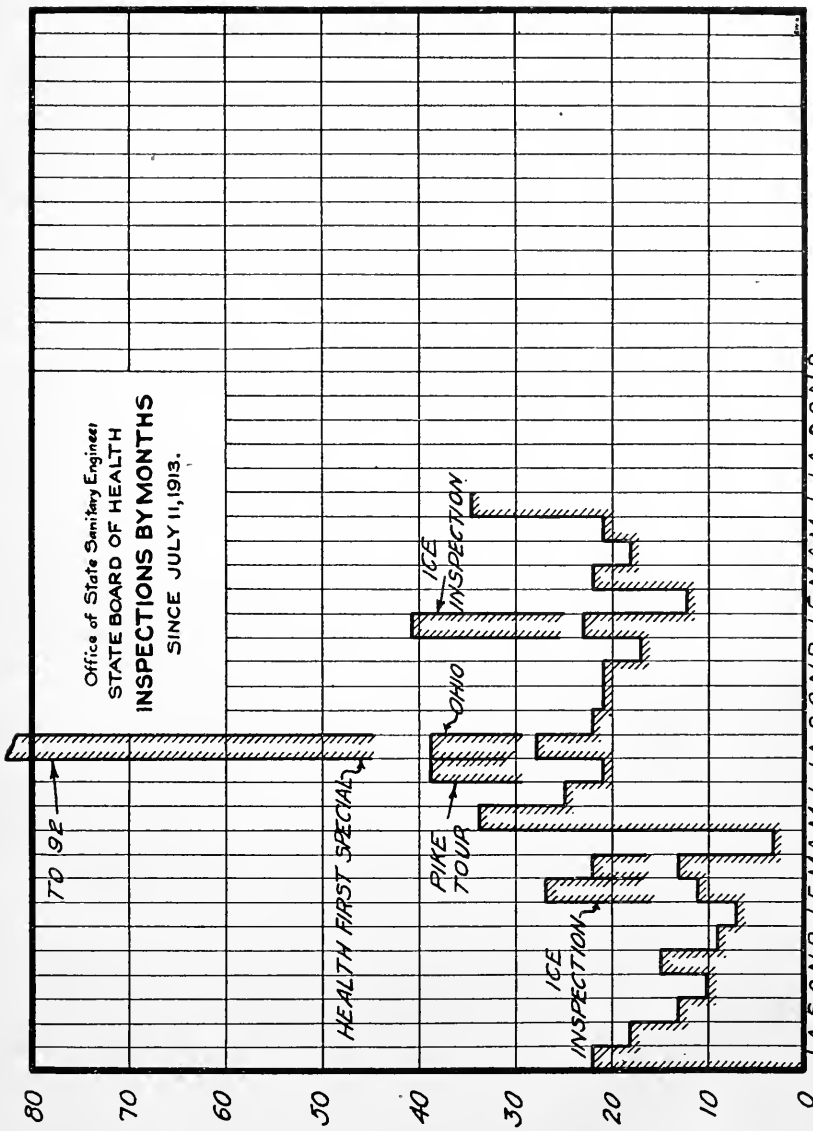

Office of State Sanitary Engineer
STATE BOARD OF HEALTH
INSPECTIONS BY MONTHS
SINCE JULY 11, 1913.
TO 92
HEALTH FIRST SPECIAL
OHIO
PIKE TOUR
ICE INSPECTION
ICE INSPECTION
80
70
60
50
40
30
20
10
0
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1913
1914
1915

TABLE NO. 12.—*Showing inspections outside of state, made by Mr. Edward D. Rich, State Sanitary Engineer, July 1, 1914, to July 1, 1915.*

Alliance, Ohio	Aug. 28, 1916	Garbage disposal.
Atlanta, Ga	Dec. 8, 1914	Sewage disposal.
Baltimore, Md	Oct. 28, 1914	Sewage disposal.
Brockton, Mass	Oct. 30, 1914	Sewage disposal.
Canton, Ohio	Aug. 27, 1914	Garbage disposal.
Cleveland, Ohio	Aug. 31, 1914	Garbage disposal.
Columbus, Ohio	Aug. 26, 1914	Garbage disposal.
Dayton, Ohio	Aug. 24, 1914	Garbage disposal.
East Liverpool, Ohio	Aug. 29, 1914	Garbage disposal.
Jacksonville, Fla	Dec. 1-4, 1914	Attendance at American Public Health Association.
Mansfield, Ohio	Aug. 26, 1914	Garbage disposal.
Marion, Ohio	Aug. 27, 1914	Garbage disposal.
Marysville, Ohio	Aug. 26, 1914	Garbage disposal.
Milwaukee, Wis	Mar. 17, 1915	Address on water supplies and sewage disposal in Michigan before Lake Michigan Water Commission.
Stubensville, Ohio	Aug. 28, 1914	Garbage disposal.
Urbana, Ill	Sept. 11, 1915	Attendance at Water Works Convention.
Youngstown, Ohio	Aug. 29, 1914	Garbage disposal.
Total 17		

TABLE NO. 13.—*Summary of inspections, investigations and consultations, July 1, 1914, to June 30, 1915,*

Number.	Subjects treated.	July to Oct. 1914.	Oct. to Jan. 1915.	June to April, 1915.	April to July, 1915.	Total.
1	Water supply purity	14	6	7	8	35
2	Water supply—location and construction	4	2	1	1	8
3	Sewerage and sewage disposal	46	24	21	41	132
4	Drainage—storm and surface water	3	3	1	0	7
5	Stream and lake pollution	4	3	0	0	7
6	Trade wastes disposal	8	5	3	9	25
7	Nuisances	15	2	2	4	23
8	Typhoid investigation	.....	.....	2	0	2
9	Resort sanitation	4	0	0	1	5
10	School house sanitation	5	6	4	2	17
11	General sanitation	40	2	3	1	46
12	Plumbing inspections	.....	.....	1	0	1
13	Ice inspections	.....	.....	17	0	17
14	Garbage collection and disposal	9	1	2	2	14
15	Public addresses	.....	.....	9	5	14
16	Examination of plans and specifications for public buildings	1	.....	.....	5	6
	Total	153	54	73	79	359

Total subjects treated	359
General inspections	268
Health First Special	53
Inspections outside of state	17
Total inspections	338

PUBLIC HEALTH LEGISLATION IN MICHIGAN IN 1915.

During the legislative session of 1915, the following public health acts were passed and approved:

Act 67, of 1915, amending section 4, of Act 81, P. A. 1873, being § 4400, Compiled Laws of 1897, was passed and now reads as follows:

At the meeting of the Legislature in the year 1905 and every six years thereafter, the Governor upon the recommendation of the State Board of Health and with the consent of the Senate shall appoint a suitable and competent person who shall be a medical doctor of ten years' practice, duly licensed as a medical practitioner in this state to be the seventh member of the board, which member shall be the secretary of the said board and its executive officer.

U. P. LABORATORY.

An act to provide for the establishment of a branch bacteriological laboratory in the upper peninsula of the state and authorizing the employment of a bacteriologist to take charge thereof; to authorize the purchase of the necessary appliances and apparatus for such laboratory, and providing an appropriation therefor.

[Act 164, P. A. 1915.]

The People of the State of Michigan enact:

Section 1. The state board of health is hereby authorized and empowered to establish a branch bacteriological laboratory in the upper peninsula of the state, and to employ a competent bacteriologist to take charge of such laboratory, whose duties shall be such as are or may be defined by law or defined by the state board of health, and shall be performed in connection with the department of the state board of health. The same fees shall be paid for examinations and analysis made by this said bacteriologist as are required by act one hundred nine of the public acts of nineteen hundred seven, as amended from time to time.

Sec. 2. The salary of the person appointed bacteriologist under this act shall be fixed by the state board of health, but shall not exceed the salary paid to the bacteriologist appointed under the provision of act one hundred nine of the public acts of nineteen hundred seven. Such salary shall be paid in the same manner as other employes of the state board of health are paid, and all fees paid or received by the said bacteriologist shall be immediately forwarded to the secretary of the state board of health at Lansing to be by him covered into the state treasury to the general bacteriological fund of the state as provided in section three of act one hundred nine of the public acts of nineteen hundred seven.

Sec. 3. The state board of health is hereby authorized to purchase any and all such apparatus and appliances as shall be necessary to equip the branch laboratory authorized in this act: Provided, That the amount paid as salary to the bacteriologist and expended for the apparatus and appli-

ances in any one year shall not exceed the amount of the yearly appropriation provided for in this act. The state board of health shall select and designate a central point in the upper peninsula for the location of said laboratory. In all matters not herein otherwise expressly provided for, the said branch laboratory shall be governed by the provisions of act one hundred nine of the public acts of nineteen hundred seven, as amended from time to time.

Sec. 4. For the purpose of carrying out the provisions of this act, there is hereby appropriated out of any moneys in the state treasury not otherwise appropriated for the fiscal year ending June thirty, nineteen hundred sixteen, the sum of six thousand dollars, and for the fiscal year ending June thirty, nineteen hundred seventeen, and annually thereafter, the sum of four thousand dollars, which amounts shall be paid to the state board of health in the manner now provided by the general accounting laws of the state.

Sec. 5. The auditor general shall add to and incorporate in the state tax for the year nineteen hundred fifteen, the sum of six thousand dollars, and for the year nineteen hundred sixteen, and annually thereafter, the sum of four thousand dollars, which amounts when collected, shall be credited to the general fund to reimburse the same for the money hereby appropriated.

APPROPRIATION TO LESSEN TUBERCULOSIS.

An Act making an appropriation to lessen the tuberculosis disease in the state of Michigan and directing the manner of the expenditure of the moneys appropriated.

[Act 238, P. A. 1915.]

The People of the State of Michigan enact:

Section 1. There is hereby appropriated from the general fund of the state the sum of fifty thousand dollars for the fiscal year ending June thirty, nineteen hundred sixteen, and the further sum of fifty thousand dollars for the fiscal year ending June thirty, nineteen hundred seventeen, for the purpose of making a tuberculosis survey of the state, the employment of medical men and nurses and other experts to make said survey, the organization of anti-tuberculosis societies throughout the state and the prosecution of a campaign to lessen the ravages of the said disease.

Sec. 2. The state board of health shall have charge of the work outlined in section one hereof and of the expenditures of the said sums of money. The moneys herein appropriated shall be paid upon vouchers approved by the state board of auditors, in accordance with the accounting laws of the state, all vouchers to be countersigned by the secretary of the state board of health. The compensation of all persons employed under authority of this act shall be fixed by the state board of health.

Sec. 3. The auditor general shall incorporate in the state tax for the year nineteen hundred fifteen the sum of fifty thousand dollars, and for the year nineteen hundred sixteen, the further sum of fifty thousand dollars which, when collected, shall be used to reimburse the general fund of the state for the moneys herein appropriated.

Section 44, of Chapter 35, R. S. 1846, being § 4453 of the Compiled Laws of 1897, was amended by Act 192, P. A. 1915, to read as follows:

Whenever any physician shall know that any person whom he is called to visit, or who is brought to him for examination, is infected with smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health, he shall immediately give notice thereof to the health officer of the township, city or village in which the sick person may be; and to the householder, hotel keeper, keeper of a boarding house, or tenant within whose house or rooms the sick person may be. The notice to the officer of the board of health shall state the name of the disease, the name, age and sex of the person sick, also the name of the physician giving the notice; and shall, by street and number, or otherwise, sufficiently designate the house or room in which such person sick may be. And every physician and person acting as a physician, who shall refuse or neglect immediately to give such notice, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not less than ten dollars nor more than fifty dollars, or by imprisonment in the county jail not exceeding thirty days in default of the payment of such fine: Provided, That this penalty shall not be enforced against a physician, if another physician in attendance has given to the health officer or other officer hereinbefore mentioned, an immediate notice of said sick person, and the true name of the disease in accordance with the requirement of this section.

VACCINATION.

An Act to authorize boards of health of cities, villages and townships to furnish vaccination to the inhabitants thereof.

[Act 146, P. A. 1879, amended by Act 118, 1915.]

The People of the State of Michigan enact:

§4465. Section 1. That the board of health of each city, village and township, may at any time direct its health officer or health physician to offer vaccination or inoculation, with bovine vaccine virus, anti-toxin and anti-typhoid vaccine to every child and to all other persons, without cost to the person vaccinated or inoculated, but at the expense of such city, village or township, as the case may be.

PUBLIC CONVENIENCE STATIONS.

[Act 285, P. A. 1915.]

Section 1. It shall be the duty of the common council of any city in this state, and of the board of trustees of any incorporated village, to cause to be constructed and maintained in such village or city not less than one public closet, commonly known and designated as a public convenience station, in such place or places as directed by the local board of health. Such closets or public convenience stations shall have thereon the proper signs and be so placed as directed by the local board of health as to be easily accessible from the business district or districts of such city or village, and shall be maintained in a sanitary manner under the supervision of the local board of health. Suitable and adequate accommodations shall be afforded at such public convenience station, to the members of both sexes.

Sec. 2. Any person destroying, mutilating, injuring, despoiling or abusing the property of any part thereof included within a public convenience station as provided for in this act, shall be deemed guilty of a mis-

demeanor, and upon conviction thereof shall be punished by a fine of not more than fifty dollars, or imprisonment in the county jail for a period of not more than sixty days, or by both such fine and imprisonment in the discretion of the court.

Act 74 of 1915, amending Section 2, Act 139, P. A. 1909, which is an act relative to the maintenance and construction of hospitals and sanatoria within the counties of this state and to provide a tax to raise moneys therefor. Said section as amended now reads as follows:

Sec. 2. The tax provided for herein shall be apportioned and collected as other taxes for county purposes. Said tax shall not exceed five per cent of the general fund for any one year unless the same shall have been submitted to a vote of the qualified electors of such county.

Sec. 1, Act 137, P. A. 1883, was amended by Act 193, P. A. 1915, to read as follows:

"It shall be the duty of the health officer to comply with and enforce the rules and regulations and the health laws of the State of Michigan."

Sec. 3, of the same act was amended by Act 193, P. A. 1915 to read as follows:

"In the fulfillment of the requirements of this act, the health officer * * * * shall be entitled to receive from the township, city or village of which he is health officer compensation at the rate of not less than *three dollars per day* while actually engaged in the performance of his duties."

FINANCIAL REPORT.

STATE BOARD OF HEALTH—GENERAL FUND—ACT 255, P. A. 1913.—FOR FISCAL YEAR ENDING JUNE 30, 1915.

1914.		
July 1.	Appropriation for fiscal year ending June 30, 1915	$15,000 00
1915.		
July 1.	Disbursements—July 1, 1914, to Nov. 15, 1915	$14,081 64
Nov.15.	Balance—charged back to general fund	$918 36

DISTRIBUTION.

Engraving, drawing, etc, , ,	$170 49
Expenses of members:	
Attending meetings	307 43
Other expenses	83 35
Instruments and books, ,	181 39
Paper, stationery, etc	2,372 22
Postage	750 00
Printing and binding,	4,343 15
Secretary	2,500 00
Special investigations	125 05
Telephone toll	108 26
Telegraph toll	49 07
Express	386 42
Educational purposes (lecturer's and demonstrators') expenses, attending "Good Health Week" meetings, etc ,	1,669 77
Engineering department (miscellaneous supplies)	413 57
Miscellaneous	621 47
Total	$14,081 64

NOTE.—The appropriation ($15,000.00) at the disposal of the State Board of Health for certain specified purposes, does not include clerk hire. The account of the appropriation ($12,000.00) for clerk hire is kept in the Auditor General's office and is published in his annual report.

Respectfully submitted,
JNO. L. BURKART,
Secretary

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH, LANSING LABORATORY (UNDER SECTION 5 OF ACT 122, LAWS OF 1909), AS ALLOWED DURING THE FISCAL YEAR ENDING JUNE 30, 1915.

RECEIPTS.		DISBURSEMENTS.	
State Treasurer, by appropriation	$5,000 00	Salaries of bacteriologist and assistant	$3,700 00
Fees for chemical, bacteriological and toxicological examinations	688 00	Salaries of clerks	1,205 00
		Postage	141 00
		Express	38
		Printing and stock	48 94
		Supplies	580 82
		Books	8 00
		Miscellaneous	1 50
		Unexpended balance	2 36
Total receipts	$5,688 00	Total disbursements	$5,688 00

Approved:
JNO. L. BURKART,
Secretary.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER SECTION 7, OF ACT 132, LAWS OF 1903, AS AMENDED BY ACT 151, LAWS OF 1907), EMBALMERS' FUND AS ALLOWED DURING THE FISCAL YEAR, 1915.

RECEIPTS.		DISBURSEMENTS.	
Fees from applicants for licenses and for renewals of licenses	$1,135 65	Expenses of members attending meetings	$273 36
		Paper, stationery, etc	55 11
		Postage	300 00
		Printing and binding	148 53
		Drawing, engraving, etc	18 50
		Express	5 68
		Telegraph toll	30
		Telephone toll	3 56
		Miscellaneous	98 67
		To State treasurer (unexpended amount to balance account)	231 94
Total receipts	$1,135 65	Total disbursements	$1,135 65

Approved:
JNO. L. BURKHART,
Secretary.

DIVISION OF COMMUNICABLE DISEASES.

PNEUMONIA IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

Table 1 of this report shows the general prevalence of pneumonia in Michigan for each of the years, 1898-1914. During the year 1914 there were reported to this Department 3,470 cases of pneumonia, of which number 2,751 or 79 per cent, proved fatal. These deaths correspond to an annual death rate of 92.4 per 100,000 population.

As indicated by the death rates, pneumonia was less prevalent in this State in 1914 than in any year since 1909. While this decrease in the prevalency of pneumonia was slight, still it is of some satisfaction to note that the death rate from this disease in Michigan, compared with other States of the Registration Area, is much below the average. Below are given the death rates from pneumonia (all forms) in each of the States of the Registration Area for the year 1914:

Average death rate for all Registration States, 124.4 per 100,000 population; California, 93.5; Colorado, 113.5; Connecticut, 154.3; Indiana, 105.0; Kansas, 67.1; Kentucky, 108.4; Maine, 146.7; Maryland, 158.2; Massachusetts, 155.6; Michigan, 92.4; Minnesota, 97.3; Missouri, 108.9; Montana, 107.3; New Hampshire, 127.9; New Jersey, 153.7; New York, 155.6; North Carolina, 150.1; Ohio, 108.1; Pennsylvania, 146.0; Rhode Island, 143.1; Utah, 112.7; Vermont, 112.7; Virginia, 106.0; Washington, 50.6; and Wisconsin, 95.5.

Of the States above named, only two, Kansas and Washington, had a lower rate than Michigan in 1914.

TABLE 1.—*The prevalence of pneumonia, in Michigan, in each of the seventeen years, 1898-1914.*

Years.	*Cases.	Deaths.	Deaths per 100,000 population.
1898	.....	2,047	86.7
1899	.....	2,479	103.7
1900	.....	2,388	98.6
1901	.....	2,901	118.4
1902	.....	2,637	106.5
Average, 1898–1902	.....	2,490	102.9
1903	.....	2,607	104.2
1904	3,790	2,646	104.6
1905	3,227	2,417	94.5
1906	3,387	2,621	101.4
1907	3,976	3,018	115.6
Average, 1903–1907	3,595	2,662	104.1
1908	3,177	2,313	87.6
1909	3,142	2,265	84.9
1910	3,671	2,785	99.1
1911	3,452	2,763	96.7
1912	3,592	2,796	96.3
Average, 1908–1912	3,407	2,584	93.1
1913	3,687	2,894	98.1
1914	3,470	2,751	92.4

*Previous to 1904 pneumonia was not reported to this Department.

GEOGRAPHICAL DISTRIBUTION OF PNEUMONIA.

As indicated by the death rates, Table 2 shows the prevalence of pneumonia by geographical sections of the State, also the prevalence in the counties constituting each of the sections, during the years 1914 and 1913 and the annual average death rates for the years, 1904-1912.

In 1914, as in other years, the Southern Section of the State experiences the highest death rate, while the Northern Section, on the average, has the lowest rate, but in 1914 the lowest rate was recorded in the Central Section of the State. The high rate in the Southern Section of counties is influenced by the excessively high rate in Wayne county. Each of the sections of the State shows a decrease in the prevalence of this disease in 1914 as compared with their average annual rate. The rate for the Central Section shows a decrease of 22.3 per cent in its rate for 1914; Northern Section, 7.8 per cent; Upper Peninsula Section, 5.1; and the Southern Section, 2.5 per cent.

The counties having unusually high death rates from pneumonia in 1914 as compared with the rate for the State for that year (92.4) were: Oseoda (188.7), Luce (171.4), Wayne (168.3), Roscommon (151.7), Crawford (150.4), Iron (150.0), Schooleraft (149.2), Otsego (131.3), Alpena (124.3), and Livingston (116.8).

The counties having unusually low death rates from pneumonia in 1914, were: Ontonagon (20.7), Gladwin (24.1), Sanilac (33.0), Barry (34.7), Kalkaska (35.6), Antrim (38.2), Mackinac (40.3), Grand Traverse (41.4), Ottawa (42.2), Keweenaw (45.0), Dickinson (46.3), Houghton (47.1), Benzie (47.5), Cass (47.6), Leelanau (47.8), Cheboygan (49.2), Ingham (50.2), Newaygo (50.6), Branch (51.8), Mason (51.5), Mecosta (52.7), Clare (53.9), Iosco (54.2), Montcalm (54.4), Shiawassee (54.7), Menominee (55.8), Charlevoix (56.9), Allegan (56.9), Ogemaw (57.1), Gratiot (57.8) and Jackson (59.0).

TABLE 2.—*Showing the cases, deaths and death rates per 100,000 population from pneumonia in Michigan, and in each of the counties of the State, for the years 1914 and 1913; also the averages for the years 1904-1912, inclusive.*

State and counties by geographical sections.	1914.			1913.			Average, 1904-1912.		
	Cases.	Deaths.	Deaths per 100,000 population.	Cases.	Deaths.	Deaths per 100,000 population.	Cases.	Deaths.	Deaths per 100,000 population.
STATE OF MICHIGAN	**3,470**	**2,751**	**92.4**	**3,687**	**2,894**	**98.1**	**3,494**	**2,625**	**97.7**
I.—Upper Peninsula	**332**	**266**	**74.9**	**383**	**294**	**83.8**	**382**	**278**	**92.4**
Alger	9	9	106.7	13	6	72.8	8	7	94.9
Baraga	4	4	58.7	5	4	60.3	9	5	89.6
Chippewa	24	22	84.5	24	23	89.7	30	22	96.1
Delta	37	31	96.4	49	49	154.8	35	32	108.7
Dickinson	10	10	46.3	17	10	46.9	19	16	78.9
Gogebic	20	20	73.1	21	21	79.7	19	18	88.3
Houghton	66	47	47.1	76	71	73.3	111	80	101.1
Iron	29	29	150.0	24	18	98.5	13	11	96.2
Keweenaw	6	4	45.0	6	4	47.3	14	5	76.3
Luce	7	7	171.4	7	7	172.2	5	5	116.2
Mackinac	4	4	40.3	3	3	30.8	7	6	68.9
Marquette	78	50	97.6	95	46	91.8	65	37	87.9
Menominee	18	14	55.8	20	19	75.3	26	24	92.2
Ontonagon	5	2	20.7	11	3	31.9	10	5	61.4
Schoolcraft	15	13	149.2	12	10	114.9	11	5	60.8
II.—Northern Counties	**325**	**243**	**72.9**	**298**	**207**	**62.3**	**383**	**266**	**79.1**
Alcona	5	5	87.5	1	1	17.5	5	4	52.3
Alpena	33	25	124.3	22	22	109.6	18	18	88.5
Antrim	18	6	38.2	16	14	89.1	17	12	78.5
Arenac	7	6	64.7	6	4	42.7	9	9	90.0
Benzie	9	5	47.5	5	5	47.3	12	10	88.4
Charlevoix	13	12	56.9	16	10	48.5	21	13	69.6
Cheboygan	12	9	49.2	14	13	71.5	20	16	87.2
Clare	6	5	53.9	8	4	43.2	10	5	52.4
Crawford	7	6	150.4	5	4	100.7	5	4	88.6
Emmet	23	20	105.2	13	13	68.8	22	15	77.3
Gladwin	4	2	24.1	6	3	36.1	7	5	58.1
Grand Traverse	15	10	41.4	14	13	54.0	27	20	80.1
Iosco	5	5	54.2	1	1	10.7	8	7	67.6
Kalkaska	6	3	35.6	5	5	59.9	6	5	66.7
Lake	7	3	61.2	6	3	61.1	5	3	51.2
Leelanau	5	5	47.8	7	5	47.6	10	8	72.7
Manistee	33	24	91.0	43	19	71.8	52	23	84.9
Mason	14	12	51.5	12	12	52.3	24	18	88.8

Missaukee	14	12	110.8	7	7	65.0	13	12	113.2
Montmorency	6	3	76.6	4	3	77.4	6	3	92.5
Ogemaw	6	5	57.1	10	10	113.6	11	10	99.5
Osceola	16	14	80.5	30	9	51.4	21	13	69.1
Oscoda	6	4	188.7	2	1	47.7	5	2	84.0
Otsego	10	8	131.3	2	2	32.2	8	6	83.9
Presque Isle	8	9	78.3	11	7	61.2	10	8	70.2
Roscommon	4	4	151.7	4	4	157.1	4	1	75.3
Wexford	33	21	96.3	28	13	60.3	27	16	75.2
III.—Central Counties	**394**	**308**	**66.9**	**405**	**352**	**76.6**	**502**	**395**	**86.1**
Bay	67	63	88.2	80	79	111.8	73	63	96.3
Gratiot	28	16	57.8	29	14	50.1	37	27	88.8
Huron	25	25	72.2	29	28	80.8	32	27	76.4
Isabella	35	19	85.2	24	19	84.5	38	20	82.5
Mecosta	19	10	52.7	14	14	73.3	23	16	82.2
Midland	13	11	81.0	11	11	80.4	16	13	91.4
Montcalm	22	17	54.4	26	21	66.7	32	27	80.5
Muskegon	39	33	77.3	36	34	80.6	48	39	100.6
Newaygo	17	10	50.6	7	6	30.6	18	12	63.0
Oceana	30	16	87.9	18	10	53.4	20	16	84.4
Saginaw	75	66	72.0	76	70	76.8	89	78	87.5
Sanilac	17	11	33.0	29	23	68.7	34	27	77.5
Tuscola	26	22	64.3	26	23	66.9	42	30	84.6
IV.—Southern Counties	**2,400**	**1,923**	**104.3**	**2,601**	**2,041**	**113.0**	**2,227**	**1.689**	**106.0**
Allegan	38	23	56.9	32	20	49.7	43	31	77.7
Barry	13	8	34.7	7	6	26.2	27	17	77.1
Berrien	58	34	60.2	67	40	71.8	45	31	60.2
Branch	20	13	51.8	35	14	55.6	23	15	59.2
Calhoun	67	44	74.5	76	32	54.7	87	49	87.0
Cass	11	10	47.6	17	13	62.1	23	17	84.8
Clinton	25	16	73.6	18	14	63.4	29	18	72.8
Eaton	35	26	85.6	34	26	85.5	40	27	89.0
Genesee	105	54	68.3	107	60	79.5	74	54	104.8
Hillsdale	44	23	77.7	28	23	77.7	30	21	70.2
Ingham	50	30	50.2	53	29	49.9	56	35	71.0
Ionia	44	35	106.5	28	24	72.7	38	27	79.9
Jackson	52	34	59.0	45	37	65.4	88	44	89.4
Kalamazoo	108	75	111.1	135	53	80.6	114	59	104.6
Kent	184	113	65.3	189	117	69.9	179	142	94.4
Lapeer	27	18	71.0	42	23	90.1	49	31	117.4
Lenawee	42	33	70.0	56	45	95.1	53	39	78.6
Livingston	31	20	116.8	24	13	75.2	22	14	75.8
Macomb	39	29	89.7	33	32	98.8	36	28	84.9
Monroe	38	29	88.1	35	27	82.0	40	31	93.3
Oakland	63	51	97.8	54	34	66.0	73	50	105.9
Ottawa	35	20	42.2	28	21	44.8	52	31	70.5
St. Clair	54	42	83.7	40	28	55.2	64	49	89.1
St. Joseph	19	19	70.3	22	22	82.6	26	23	98.4
Shiawassee	22	18	54.7	26	24	72.7	38	22	67.1
Van Buren	28	21	65.6	59	26	80.5	37	26	75.3
Washtenaw	54	28	64.6	43	37	84.7	54	39	84.9
Wayne	1,094	1,057	168.3	1,268	1,201	198.8	787	719	156.7

PNEUMONIA IN CITIES OF MICHIGAN OF 10,000 INHABITANTS AND OVER.

Based on the death rates, the prevalence of pneumonia in cities of Michigan of 10,000 inhabitants and over is shown in Table 3.

The highest death rates from this disease seem to prevail in the group of cities having the greatest number of inhabitants. This death rate is influenced to a very great extent by the unusually high rate recorded for the city of Detroit. Grand Rapids and Saginaw, the other two cities constituting this group, had rates lower than that for the State as a whole, and which rates were considerably lower than the rates for some of the cities having less populations. The group of cities having from 10,000 to 25,000 inhabitants, with the exception of the year 1913, has the lowest rates of the three groups shown in the Table.

Of the cities shown in the Table, those having unusually high death rates in 1914, compared with the rate for the State for that year, were: Detroit (162.6), Alpena (154.9), Pontiac (135.6), Kalamazoo (124.3), and Port Huron (121.6).

The cities experiencing unusually low death rates in 1914, were: Lansing (44.1), Ann Arbor (46.8), Traverse City (47.2) and Menominee (59.3).

TABLE 3.—*The deaths and death rates per 100,000 population from pneumonia, in cities of Michigan, of 10,000 inhabitants and over, in 1914 and 1913, also the average number of deaths and the rates for the years, 1904-1912.*

Cities.	1914.		1913.		Average, 1904-1912.	
	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.
CITIES OVER 50,000	1,055	142.3	1,216	170.5	852	155.5
Detroit	918	162.6	1,087	201.4	695	177.2
Grand Rapids	93	75.1	80	66.1	106	100.3
Saginaw	44	82.8	49	93.4	51	102.2
CITIES FROM 25,000 to 50,000	224	81.2	224	84.3	228	111.0
Battle Creek	22	80.6	15	56.0	26	104.3
Bay City	45	99.6	61	128.6	48	117.3
Flint	38	69.9	44	87.3	31	124.8
Jackson	24	67.6	23	66.7	28	101.0
Kalamazoo	57	124.3	39	88.1	47	131.4
Lansing	17	44.1	21	57.2	19	65.3
Muskegon	21	80.2	21	81.9	29	130.9
CITIES FROM 10,000 to 25,000	172	97.5	185	105.9	181	110.1
Adrian	8	74.0	10	92.5	11	98.7
Alpena	20	154.9	15	116.6	12	94.1
Ann Arbor	7	46.8	19	127.3	16	108.8
Escanaba	16	109.7	35	245.8	18	143.7
Ironwood	11	74.9	6	42.2	8	71.2
Ishpeming	14	107.7	15	166.6	14	124.3
Manistee	12	98.7	4	32.2	11	92.2
Marquette	11	91.2	14	117.4	13	115.6
Menominee	6	59.3	10	97.9	13	128.1
Pontiac	23	135.6	19	116.2	20	156.7
Port Huron	22	121.6	15	82.1	21	104.7
Sault Ste. Marie	16	119.4	17	121.2	14	114.1
Traverse City	6	47.2	6	47.8	10	81.9

SEASONAL PREVALENCE OF PNEUMONIA.

By reference to Table 4 it will be seen that pneumonia is most prevalent during the months of February and March and least prevalent in the month of August.

TABLE 4.—*The seasonal prevalence of broncho and other forms of pneumonia, in Michigan, as indicated by the number of deaths from the two forms of this disease during each of the months of 1914, and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.				Average, 1898-1913.			
	Broncho.		Other forms.		Broncho.		Other forms.	
	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.
January	114	151.2	281	177.8	75	156.3	278	161.6
February	145	213.5	220	154.4	78	179.2	310	186.0
March	152	201.6	318	201.3	85	177.1	305	177.3
April	115	157.8	238	155.7	67	143.8	254	152.3
May	79	104.8	175	110.8	50	104.2	191	111.1
June	32	43.8	85	55.7	31	66.7	95	57.0
July	23	30.5	50	31.6	17	35.4	53	30.8
August	24	31.8	44	27.8	17	35.4	45	26.2
September	27	37.1	46	30.4	20	43.8	60	36.0
October	37	41.1	79	50.0	29	60.4	94	54.7
November	58	79.6	128	83.5	42	89.6	140	84.3
December	82	108.8	199	127.0	56	116.7	206	119.8
Total	888	100.0	1,863	100.0	567	100.0	2,031	100.0

AGE DISTRIBUTION OF PNEUMONIA.

The age distribution of pneumonia is shown in Table 5. A study of the death rates at the various age groups indicates that in 1914, as compared with their average annual rates, broncho pneumonia shows an increase in the death rates at each age group, while from other forms of pneumonia a considerable decrease is noted. At all ages, the death rate per 100,000 population from broncho pneumonia in 1914 was 29.6, while the average annual rate was 21.7. This is an increase of 31 per cent in the death rate of 1914 over the average for former years. The deaths from other forms of pneumonia in 1914 was equivalent to an annual rate of 62.2 per 100,000 population and the average annual rate for former years was 77.8, representing a decrease in the rate for 1914 of 20 per cent.

While the death rate from broncho pneumonia for 1914 shows an increase over the rate for former years at the various age groups, those at the two extremes of life had a greater influence on the increase of the death rate than at the other ages, as the rate for those under one year of age shows an increase of 50 per cent in the rate and an increase of 42 per cent in the rate of those of 80 years and over. It will be noted that it was at these two age groups also where the greatest percentage of decrease took place in the rates from other forms of pneumonia.

TABLE 5.—*The age distribution of fatal cases of broncho and other forms of pneumonia, in Michigan, as indicated by the number of deaths occurring at each age group in 1914 and the average annual number of deaths at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.				Average, 1898-1913.			
	Broncho pneumonia.		Other forms of pneumonia.		Broncho pneumonia.		Other forms of pneumonia.	
	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age
ALL AGES	888	29.6	1,863	62.2	568	21.7	2,031	77.8
Under 1 year	410	630.2	292	448.8	251	419.3	400	669.3
Under 5 years	618	192.8	460	143.5	381	136.2	615	219.8
5–9 years	22	7.8	48	17.1	16	5.8	51	19.0
10–19 years	15	2.8	74	13.8	8	1.6	94	18.3
20–29 years	15	2.7	128	23.3	9	2.1	135	29.5
30–39 years	16	3.7	165	37.9	12	3.2	149	40.5
40–49 years	15	4.3	185	53.6	12	4.0	174	59.1
50–59 years	21	7.9	209	79.1	19	9.0	192	90.6
60–69 years	53	32.4	242	147.8	34	24.9	240	178.5
70–79 years	62	79.8	234	301.2	48	75.0	249	392.4
80 years and over	50	249.0	115	549.8	30	175.2	130	767.1
Unknown	1	.....	3	.....	3	.....	3	.....

SEX DISTRIBUTION OF PNEUMONIA.

The information as to the sex of the decedents from pneumonia in 1914 not being available, Table 6, dealing with this phase of the study for the years, 1898-1913, and which was published in the last report of this Board, is again produced.

TABLE 6.—*The influence of sex in fatal cases of broncho and other forms of pneumonia, in Michigan, as indicated by the number of yearly deaths and the death rates per 100,000 population of each sex during the years, 1898-1913.*

Years.	Pneumonia.											
	Broncho.						Other forms.					
	Annual deaths.			Death rates per 100,000 population of each sex.			Annual deaths.			Death rates per 100,000 population of each sex.		
	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.
1898	242	127	115	10.3	10.3	9.9	1,805	992	813	76.8	80.7	70.1
1899	287	162	125	12.0	13.0	10.6	2,192	1,226	966	91.9	98.4	81.9
1900	353	186	167	14.6	14.9	14.2	2,035	1,089	946	84.1	87.2	80.7
1901	489	239	250	20.0	18.9	21.1	2,412	1,352	1,060	98.4	107.0	89.3
1902	502	283	219	20.3	22.2	18.2	2,135	1,189	946	86.2	93.3	78.7
1903	588	297	291	23.5	23.1	23.9	2,019	1,118	901	80.7	86.9	74.1
1904	545	270	275	21.5	20.8	22.3	2,101	1,164	937	83.0	91.2	76.1
1905	485	239	246	19.0	18.2	19.7	1,932	1,059	873	75.5	80.8	70.1
1906	540	287	253	20.9	21.7	20.1	2,081	1,194	887	80.5	90.2	70.3
1907	625	325	300	23.9	24.3	23.5	2,393	1,371	1,022	91.6	102.6	80.1
1908	485	256	229	18.4	19.0	17.7	1,828	1,036	792	69.3	76.8	61.4
1909	507	255	252	19.0	18.7	19.3	1,758	981	777	66.0	72.1	59.5
1910	741	382	359	26.4	26.3	26.5	2,044	1,196	848	72.7	82.2	62.6
1911	805	441	364	28.2	29.8	26.4	1,958	1,139	819	68.5	76.3	59.5
1912	939	508	431	32.3	33.7	30.9	1,857	1,086	771	64.0	72.1	55.2
1913	947	530	417	32.1	34.6	29.4	1,947	1,195	752	66.0	78.0	53.0
Annual average	568	299	268	21.7	22.3	21.2	2,031	1,149	882	77.8	85.5	69.6

RESTRICTIVE AND PREVENTIVE MEASURES IN PNEUMONIA.

As there are a large number of non-fatal cases of pneumonia occurring in this State that are not reported by the attending physicians to the local health officers, it becomes impossible therefore for the restrictive and preventive measures to be carried out in all instances.

While this Board recommends that all persons sick with pneumonia must be isolated from all persons except the attendants, still it is believed that if the sputa and other discharges from the respiratory tract of the patients, together with the clothing and other articles contaminated by these discharges, are properly disinfected, little danger of the spread of the disease to others may be feared.

By Table 7 it will be seen that, in 1914, while the restrictive and preventive measures were enforced in a greater percentage of instances than for the average year, these measures were enforced in a lesser degree than in 1913.

TABLE 7.—*Restrictive and preventive measures in pneumonia, in Michigan, in 1914 and 1913 and the average for the years, 1904-1912.*

Restrictive and preventive measures.	1914.		1913.		Average, 1904-1912.	
	Cases.	Per cent.	Cases.	Per cent.	Cases.	Per cent.
ISOLATION:						
Enforced	2,239	64	2,529	68	1,414	41
Neglected	342	10	373	10	636	18
Not stated or statements doubtful	889	26	831	22	1,440	41
DISINFECTION OF SPUTA:						
Enforced	2,435	*71	2,751	*74	1,665	*49
Neglected	106	*3	126	*4	267	*8
Not stated or statements doubtful	902	*26	826	*22	1,481	*43
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:						
Enforced	2,500	*73	2,818	*76	2,043	*60
Neglected	72	*2	78	*2	248	*7
Not stated or statements doubtful	871	*25	807	*22	1,122	*33
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:						
Enforced	2,503	72	2,854	76	2,039	58
Neglected	93	3	90	2	375	11
Not stated or statements doubtful	874	25	789	22	1,076	31

*During the years 1904-1912, there were on the average of 77 instances per year in which there was said to be no sputa: in 1913, 30 instances, and in 1914, 27 instances, therefore these numbers have been deducted from the total number of cases occurring in each of the above years before making the per cents.

TUBERCULOSIS IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

As may be seen by reference to Table 8, there occurred in Michigan in 1914, 2,364 deaths from pulmonary tuberculosis, which number corresponds to an annual death rate of 79.4 per 100,000 population. During the same year there also occurred 416 deaths from other forms of tuberculosis, representing a death rate of 13.9 per 100,000 population.

Compared with 1913, the 1914 death rate from pulmonary tuberculosis shows an increase of 2.4 deaths per each 100,000 of the population, the rate for 1913 being 77.0. The rate from other forms of tuberculosis for 1914 shows a slight decrease compared with 1913.

The law, providing for the compulsory reporting of all cases of tuberculosis coming to the attention of physicians, became operative in 1909, and while the figures in the following table show that the number of living cases were exceeded by the number of deaths from tuberculosis, which is an indication that the physicians were not reporting all the cases they were attending, still the reported living cases in 1914 shows a decided improvement over former years.

Years.	Deaths reported.	Living cases reported.
1911	2,766	1,805
1912	2,744	1,958
1913	2,693	1,920
1914	2,780	3,648

TABLE 8.—*The prevalence of tuberculosis, in Michigan, in each of the seventeen years, 1898-1914.*

Years.	Pulmonary.		Other forms.	
	Deaths.	Deaths per 100,000 population.	Deaths.	Deaths per 100,000 population.
1898	2,153	91.6	673	28.6
1899	2,098	87.9	596	25.0
1900	2,018	83.4	460	19.0
1901	2,152	87.8	380	15.5
1902	2,088	84.3	357	14.4
Average, 1898-1902	2,102	86.9	493	22.9
1903	2,155	86.1	393	15.7
1904	2,306	91.1	441	17.4
1905	2,288	89.5	437	17.1
1906	2,303	89.1	422	16.3
1907	2,338	89.5	383	14.7
Average, 1903–1907	2,278	89.1	415	16.2
1908	2,249	85.2	451	17.1
1909	2,237	83.9	387	14.5
1910	2,273	80.9	483	17.2
1911	2,284	79.9	482	16.9
1912	2,289	78.8	455	15.7
Average, 1908-1912	2,266	81.7	452	16.3
1913	2,273	77.0	420	14.2
1914	2,364	79.4	416	13.9

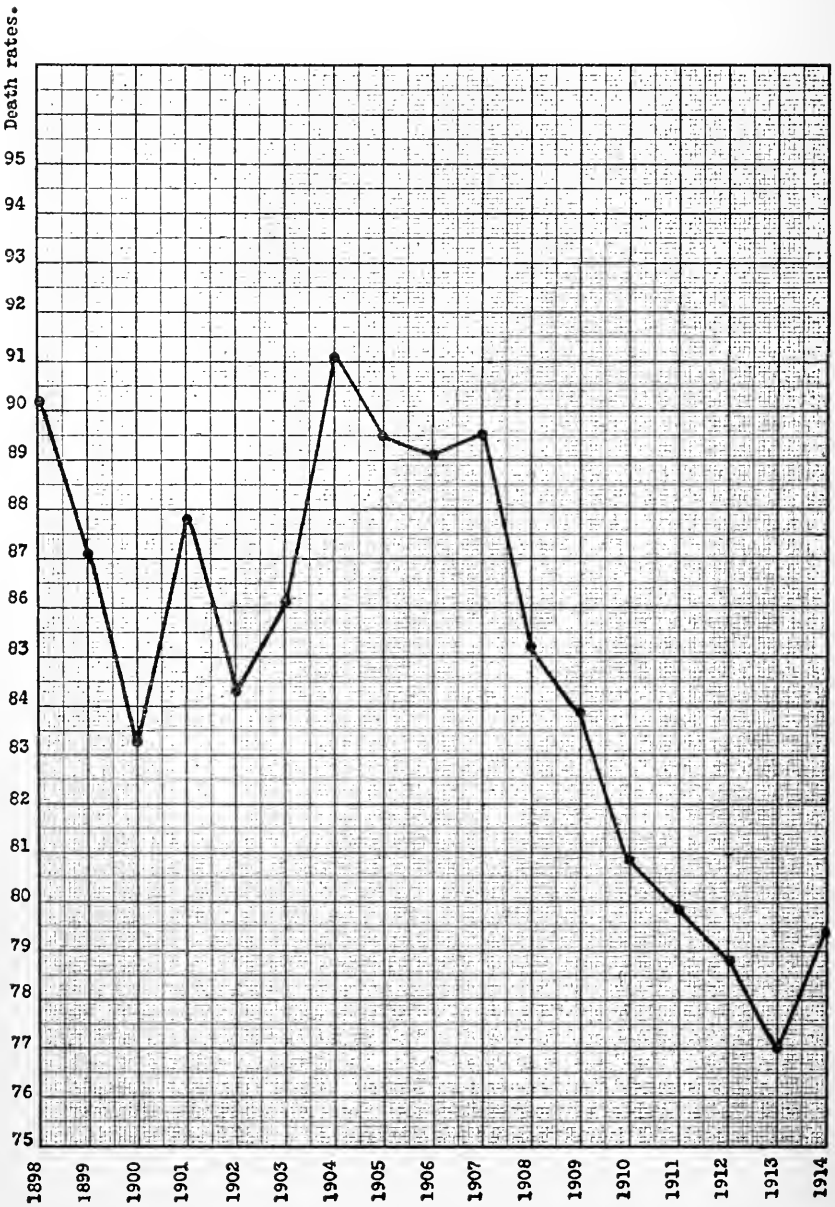
In presenting the death rates from tuberculosis for other States and for the subdivisions of this State, this Department desires to emphasize the fact that crude rates are to be used with extreme caution. The fact that there are many States to which consumptives are attracted because of climatic conditions favorable to the treatment of tuberculosis, is one of several reasons why certain States show an extremely high death rate from this disease. For this reason States having high rates are not always those in which conditions are most favorable to the development of tuberculosis. Another fact which should be borne in mind is that the death rate from tuberculosis among the colored population is very much higher than among the white. Therefore, in comparing the death rates of the States shown in the following Table, the constitution of the population in respect to color must be considered. While the factors of climatic conditions and color of population do not influence to any great extent the death rates in the various subdivisions of this State, there are conditions that tend to lower or raise the rates in these subdivisions that should be considered in comparing the death rates of the various localities. The fact that the death rate from tuberculosis among insane persons is extremely high is the reason for the high rates in those cities wherein are located hospitals for the insane, while certain cities, enjoying low death rates from tuberculosis, would have much

higher rates if all the deaths among their inhabitants were credited to those cities. This is the case in certain cities maintaining tuberculosis sanitoria, which are located outside the limits of the city.

The following Table, taken from the U. S. Mortality Statistics for 1914, shows the death rates per 100,000 population from pulmonary tuberculosis in each of the States of the Registration Area by color.

Registration states.	Deaths per 100,000 population.	Registration states.	Deaths per 100,000 population.
Registration States (Total)	138.4	Montana (Total)	92.5
White	126.7	White	81.0
Colored	407.9	Colored	359.6
California (Total)	170.3	New Hampshire (Total)	99.8
White	163.1	White	99.8
Colored	310.1	Colored	147.3
Colorado (Total)	167.8	New Jersey (Total)	137.2
White	163.9	White	129.9
Colored	360.2	Colored	330.7
Connecticut (Total)	126.0	New York (Total)	148.3
White	122.1	White	142.6
Colored	397.4	Colored	498.7
Indiana (Total)	125.0	North Carolina (Total)	221.7
White	117.3	White	160.2
Colored	457.8	Colored	338.7
Kansas (Total)	49.3	Ohio (Total)	112.8
White	43.0	White	105.0
Colored	232.7	Colored	434.3
Kentucky (Total)	182.2	Pennsylvania (Total)	107.2
White	152.8	White	99.9
Colored	409.4	Colored	382.4
Maine (Total)	94.3	Rhode Island (Total)	134.6
White	93.8	White	127.7
Colored	245.8	Colored	498.9
Maryland (Total)	181.0	Utah (Total)	40.8
White	141.2	White	37.6
Colored	362.8	Colored	212.9
Massachusetts (Total)	118.8	Vermont (Total)	80.6
White	114.7	White	80.9
Colored	447.8	Colored	.....
Michigan (Total)	79.4	Virginia (Total)	161.8
White	77.0	White	108.7
Colored	352.3	Colored	271.6
Minnesota (Total)	89.9	Washington (Total)	69.9
White	86.0	White	65.3
Colored	580.3	Colored	224.5
Missouri (Total)	132.3	Wisconsin (Total)	85.0
White	114.8	White	83.4
Colored	480.2	Colored	351.3

DIAGRAM SHOWING THE DEATH RATES FROM PULMONARY TUBERCULOSIS PER 100,000 POPULATION, IN MICHIGAN, DURING THE YEARS, 1898-1914.



GEOGRAPHICAL DISTRIBUTION OF TUBERCULOSIS.

The distribution of tuberculosis by geographical sections of the State is shown in Table 9.

As indicated by the average annual death rates per 100,000 population, tuberculosis is more prevalent in the Upper Peninsula Section than in any of the other sections of the State, and least prevalent in the Northern Section. The 1914 death rate for each of the Sections is less than their average annual rate, the Central section showing the greatest percentage of decrease. The sections of the State, arranged according to the greatest percentage of decrease are: Central, 26 per cent; Northern, 12.5; Southern, 7; and the Upper Peninsula, 5.9.

The counties of the State having unusually high death rates from tuberculosis (all forms) in 1914 compared with the rate for the State as a whole (92.8), were: Luce (342.7), Grand Traverse (161.4), Wayne (144.2), Menominee (127.5), Houghton (127.4), Livingston (122.6), Van Buren (121.9) and Lapeer (117.5). The high rates in Luce and Grand Traverse counties are influenced entirely by the excessive number of deaths from this disease occurring in the hospitals for the insane located in these counties, while the high rate in Livingston county may be attributed to the fact that the State Tuberculosis Sanatorium is located in that county.

TABLE 9.—*Showing the deaths and death rates per 100,000 population from tuberculosis in the State of Michigan, and in each of the counties thereof, in 1914, also the average annual number of deaths and the rates per 100,000 population for the years, 1898-1913, inclusive.*

State and counties by geographical sections.	1914.						Average, 1898-1913.					
	Deaths.			Death rates per 100,000 population.			Deaths.			Death rates per 100,000 population.		
	Total.	Pulmonary.	Other forms.	Total.	Pulmonary.	Other forms.	Total.	Pulmonary.	Other forms.	Total.	Pulmonary.	Other forms.
STATE OF MICHIGAN	**2,780**	**2,364**	**416**	**92.8**	**78.9**	**13.9**	**2,681.9**	**2,243**	**438.9**	**102.5**	**85.7**	**16.8**
I.—Upper Peninsula	378	319	59	105.2	88.8	16.4	322	260	62	111.8	90.0	21.8
Alger	7	6	1	83.0	71.1	11.9	5	4	1	69.2	53.5	15.7
Baraga	5	5	0	73.4	73.4	.....	5.7	5	.7	107.1	94.7	12.4
Chippewa	19	15	4	73.0	57.6	15.4	25	21	4	107.9	91.3	16.6
Delta	34	26	8	105.8	80.9	24.9	31	26	5	110.5	92.8	17.7
Dickinson	21	20	1	97.1	92.5	4.6	19	15	4	104.1	80.9	23.2
Gogebic	24	22	2	87.7	80.4	7.3	19	16	3	100.9	84.1	16.8
Houghton	127	101	26	127.4	101.3	26.1	95	73	22	128.3	98.4	29.9
Iron	18	16	2	93.2	82.8	10.4	8	6	2	74.3	56.3	18.0
Keweenaw	2	2	0	22.5	22.5	.....	5.6	5	.6	103.1	92.3	10.8
Luce	14	14	0	342.7	342.7	.....	6.8	6	.8	165.2	145.4	19.8
Mackinac	11	8	3	110.9	80.6	30.3	11	10	1	136.3	119.9	16.4
Marquette	53	45	8	103.4	87.8	15.6	54	43	11	127.4	102.0	25.4
Menominee	32	30	2	127.5	119.5	8.0	24	19	5	90.4	71.2	19.2
Ontonagon	1	0	1	10.4	.....	10.4	5.9	5	.9	81.3	69.8	11.5
Schoolcraft	10	9	1	114.8	103.3	11.5	7	6	1	80.4	67.5	12.9
II.—Northern Counties	262	229	33	78.6	68.7	9.9	287.9	247	40.9	89.8	77.1	12.7
Alcona	3	3	0	52.5	52.5	.....	4.8	4	.8	87.3	72.9	14.4
Alpena	12	10	2	59.6	49.7	9.9	18	15	3	89.2	75.4	13.8
Antrim	11	11	0	70.0	70.0	.....	13	10	3	83.2	65.8	17.4
Arenac	5	5	0	53.9	53.9	.....	5.9	5	.9	64.3	55.4	8.9
Benzie	11	10	1	104.4	94.9	9.5	12	10	2	107.9	89.5	18.4
Charlevoix	18	15	3	85.4	71.2	14.2	16	14	2	97.3	82.9	14.4
Cheboygan	16	16	0	87.5	87.5	.....	14	12	2	79.6	70.7	8.9
Clare	6	3	3	64.6	32.3	32.3	5.8	5	.8	64.0	55.8	8.2
Crawford	1	1	0	25.1	25.1	.....	2.3	2	.3	63.0	54.7	8.3
Emmet	14	13	1	73.7	68.4	5.3	19	16	.3	106.4	91.5	14.9
Gladwin	5	4	1	60.4	48.3	12.1	4.7	4	.7	58.4	50.2	8.2
Grand Traverse	39	34	5	161.4	140.7	20.7	34	30	.4	147.8	129.7	18.1

Iosco	10	7	3	108.3	75.8	32.5	10	8	2	91.8	75.8	16.0
Kalkaska	5	4	1	59.4	47.5	11.9	7	6	1	86.2	72.4	13.8
Lake	3	3	0	61.2	61.2	.....	4.4	4	.4	96.0	88.5	7.5
Leelanau	11	10	1	105.2	95.6	9.6	13	12	1	118.4	107.4	11.0
Manistee	28	26	2	106.2	98.6	7.6	29	25	4	107.4	91.3	16.1
Mason	21	16	5	90.0	68.6	21.4	20	17	3	99.4	84.2	15.2
Missaukee	4	2	2	37.0	18.5	18.5	6	5	1	60.0	49.7	10.3
Montmorency	2	2	0	51.1	51.1	.....	3.2	3	.2	88.3	83.1	5.2
Ogemaw	4	2	2	45.6	22.8	22.8	5.8	5	.8	61.6	53.0	8.6
Osceola	10	10	0	57.5	57.5	.....	14	12	2	76.6	65.4	11.2
Oscoda	0	0	0	.....	.....	.....	1.1	1	.1	54.7	48.3	6.4
Otsego	2	2	0	32.8	32.8	.....	3.3	3	.3	50.0	46.4	3.6
Presque Isle	9	9	0	78.3	78.3	.....	5.6	5	.6	55.4	49.6	5.8
Roscommon	1	1	0	37.9	37.9	.....	2	2	0	88.7	88.7	.....
Wexford	11	10	1	50.5	45.9	4.6	14	12	2	73.5	61.1	12.4
III.—Central Counties	**309**	**263**	**46**	**67.1**	**57.1**	**10.0**	**413**	**346**	**67**	**90.8**	**75.9**	**14.9**
Bay	54	44	10	75.6	61.6	14.0	63	54	9	95.6	81.8	13.8
Gratiot	17	17	0	61.4	61.4	.....	28	24	4	95.7	80.2	15.5
Huron	18	16	2	52.0	46.2	5.8	29	25	4	82.5	70.8	11.7
Isabella	13	12	1	58.3	53.8	4.5	22	18	4	87.6	76.1	16.5
Mecosta	9	8	1	47.5	42.2	5.3	19	15	4	90.3	72.3	18.0
Midland	12	10	2	88.3	73.6	14.7	13	11	2	87.1	71.7	15.4
Montcalm	11	9	2	35.2	28.8	6.4	29	25	4	87.6	74.6	13.0
Muskegon	45	37	8	105.3	86.6	18.7	42	35	7	108.5	91.2	17.3
Newaygo	9	8	1	45.6	40.5	5.1	14	12	2	76.5	63.4	13.1
Oceana	11	11	0	58.4	58.4	.....	15	13	2	86.1	73.9	12.2
Saginaw	69	55	14	75.3	60.0	15.3	80	66	14	92.7	76.3	16.4
Sanilac	22	19	3	66.0	57.0	9.0	28	23	5	80.1	66.4	13.7
Tuscola	19	17	2	55.5	49.7	5.8	31	25	6	86.1	70.7	15.4
IV.—Southern Counties	**1,831**	**1,553**	**278**	**99.3**	**84.2**	**15.1**	**1,659**	**1,390**	**269**	**106.8**	**89.5**	**17.3**
Allegan	23	19	4	56.9	47.0	9.9	41	35	6	93.0	77.6	15.4
Barry	6	3	3	26.0	13.0	13.0	17	14	3	72.4	61.2	11.2
Berrien	45	37	8	79.8	65.6	14.2	53	42	11	102.9	82.6	20.3
Branch	17	16	1	67.8	63.8	4.0	23	19	4	87.7	73.0	14.7
Calhoun	48	38	10	81.2	64.3	16.9	51	42	9	93.0	77.2	15.8
Cass	14	13	1	66.6	61.8	4.8	21	17	4	103.0	83.3	19.7
Clinton	9	7	2	41.4	32.2	9.2	20	17	3	79.3	68.4	10.9
Eaton	16	13	3	52.7	42.8	9.9	30	25	5	95.8	80.4	15.4
Genesee	46	38	8	58.1	48.0	10.1	44	37	7	88.7	74.1	14.6
Hillsdale	21	17	4	70.3	56.8	13.5	27	23	4	88.0	75.8	12.2
Ingham	36	25	11	60.2	41.8	18.4	36	30	6	77.7	63.9	13.8
Ionia	20	20	0	60.9	60.9	.....	33	28	5	95.7	80.9	14.8
Jackson	43	35	8	74.6	60.7	13.9	44	37	7	89.2	75.0	14.2
Kalamazoo	65	53	12	96.3	78.5	17.8	62	53	9	116.9	99.2	17.7
Kent	168	147	21	97.1	85.0	12.1	168	136	32	115.4	93.6	21.8
Lapeer	29	19	10	117.5	78.1	39.4	23	19	4	85.1	69.3	15.8
Lenawee	34	30	4	72.2	63.7	8.5	43	35	8	88.2	71.7	16.5
Livingston*	21	19	2	122.6	110.9	11.7	20	17	3	105.0	91.1	13.9
Macomb	24	21	3	74.3	65.0	9.3	35	30	5	106.4	90.5	15.9

TABLE 9.—*Concluded.*

State and counties by geographical sections.	1914.						Average, 1898–1913.					
	Deaths.			Death rates per 100,000 population.			Deaths.			Death rates per 100,000 population.		
	Total.	Pulmonary.	Other forms.	Total.	Pulmonary.	Other forms.	Total.	Pulmonary	Other forms.	Total.	Pulmonary.	Other forms.
Monroe	22	19	3	66.8	57.7	9.1	34	28	6	101.5	84.7	16.8
Oakland	35	28	7	67.1	53.7	13.4	48	41	7	108.9	93.3	15.6
Ottawa	24	19	5	50.7	40.1	10.6	40	34	6	91.8	78.0	13.8
St. Clair	40	33	7	79.8	65.8	14.0	47	38	9	87.3	70.4	16.9
St. Joseph	15	12	3	55.5	44.4	11.1	23	19	4	94.3	79.2	15.1
Shiawassee	21	16	5	63.8	48.6	15.2	31	27	4	90.8	79.3	11.5
Van Buren	39	34	5	121.9	106.3	15.6	29	24	5	85.9	71.1	14.8
Washtenaw	44	30	14	101.5	69.2	32.3	53	41	12	114.8	88.6	26.2
Wayne	906	792	114	144.2	126.1	18.1	563	482	81	131.5	112.5	19.0

*State Tuberculosis Sanatorium located in this county.

TUBERCULOSIS IN CITIES OF MICHIGAN OF 10,000 INHABITANTS AND OVER.

By reference to Table 10 it will be noted that the group of cities whose populations range from 10,000 to 25,000 has the highest annual death rate from all forms of tuberculosis. This condition remained true in 1913, but in 1914 it will be seen that the group of cities having 50,000 inhabitants and over had the highest rate from pulmonary tuberculosis, while the highest rate from other forms of tuberculosis was still registered against the former group of cities.

What has been previously stated relative to the high death rates among insane persons will account for the excessive death rates in the cities of Kalamazoo and Traverse City, wherein are located hospitals for the insane. The high death rate in Ann Arbor city is due to the fact that many persons who are not residents of that city are treated for the disease at the U. of M. hospital, and which deaths are charged to that city.

TABLE 10.—*The deaths and death rates per 100,000 population from pulmonary and other forms of tuberculosis in 1914 and 1913, also the average for the years, 1904-1912, in cities of Michigan having 10,000 inhabitants and over.*

Cities.	1914.				1913.				Average, 1904-1912.			
	Pulmonary.		Other forms.		Pulmonary.		Other forms.		Pulmonary.		Other forms.	
	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.
Cities Over 50,000 Inhabitants	**679**	**95.0**	**120**	**16.8**	**616**	**86.4**	**123**	**17.2**	**557**	**101.7**	**104**	**19.0**
Detroit	557	103.6	98	18.2	513	95.0	91	16.9	418	106.6	71	18.1
Grand Rapids	84	68.2	13	10.6	66	54.5	22	18.2	95	89.9	24	22.7
Saginaw	38	70.4	9	16.7	37	70.5	10	19.1	44	88.2	9	18.0
Cities From 25,000 to 50,000 Inhabitants	**192**	**71.7**	**45**	**17.7**	**229**	**86.2**	**33**	**12.4**	**186**	**90.5**	**32**	**15.6**
Battle Creek	23	81.8	6	21.4	17	63.4	5	18.7	22	88.3	5	20.1
Bay City	32	68.0	7	14.9	43	90.7	7	14.8	33	80.7	5	12.2
Flint	26	52.5	6	12.1	29	57.6	3	6.0	20	80.5	3	12.1
Jackson	28	82.1	6	17.6	29	84.1	2	5.8	27	97.3	4	14.4
Kalamazoo*	46	100.3	11	24.0	67	151.4	7	15.8	43	120.2	7	19.6
Lansing	13	34.7	5	13.4	21	57.2	6	16.3	16	55.0	4	13.7
Muskegon	24	94.3	4	15.7	23	87.7	3	11.3	25	112.8	4	18.0
Cities From 10,000 to 25,000 Inhabitants	**165**	**92.8**	**38**	**21.4**	**176**	**100.8**	**42**	**24.0**	**179**	**108.9**	**37**	**22.5**
Adrian	7	62.3	2	17.8	5	46.3	0	.....	8	67.4	2	17.8
Alpena	8	61.1	0	.....	7	54.4	2	15.6	12	94.1	2	15.7
Ann Arbor	16	107.0	9	60.2	14	93.8	11	73.7	16	108.8	7	47.9
Escanaba	13	88.2	4	27.1	16	112.3	2	14.0	15	119.4	3	23.9
Ironwood	11	77.8	1	7.1	8	56.3	2	14.1	8	71.2	2	17.8
Ishpeming	7	57.8	0	.....	6	46.6	1	7.8	12	106.5	3	26.6
Manistee	14	120.9	1	8.6	15	122.8	5	40.9	14	119.0	2	17.0
Marquette	8	66.0	3	24.8	7	58.7	5	41.9	13	115.6	3	26.7
Menominee	13	136.5	2	21.0	8	78.3	1	9.8	8	78.8	3	29.6
Pontiac*	14	84.5	4	24.1	25	152.8	2	12.2	19	148.8	2	15.7
Port Huron	17	90.7	4	21.3	14	76.6	5	27.4	14	69.8	2	10.0
Sault Ste. Marie	8	59.3	3	22.2	16	121.1	4	30.3	13	105.9	3	24.4
Traverse City*	29	218.6	5	37.7	35	278.8	2	15.9	27	218.9	3	24.3

*Hospitals for the insane are located in these cities.

THE PREVALENCE OF PULMONARY TUBERCULOSIS IN URBAN AND RURAL LOCALITIES.

The sanitary conditions of rural life are only partly reflected in the crude death rates of the rural localities, such as are shown in Table 11.

It is a generally accepted fact in public health discussions that the general conditions of rural territory are conducive to a low death rate from tuberculosis. Conclusions of this kind are based chiefly upon a study of the crude death rate, which indicates a lower mortality from this disease than in urban districts. It is perhaps necessary to point out that the crude death rate may be more or less misleading on account of decided variations in the comparative distribution of the urban and rural populations, by sex, age, race, nativity and occupations, each of which are vitally important factors on the prevalence of tuberculosis. A thorough statistical inquiry into the subject, however, is most difficult on account of the fact that the elements of the population of each of the counties and their subdivisions are not made fully available by the census reports, therefore, this discussion is limited to the crude death rates shown in Table 11.

It will be observed by this table that pulmonary tuberculosis is much more prevalent in cities than in rural districts. In part, this may be due to the differences in the age distribution of the populations, as the percentage of persons whose ages range from 20-40 years, among whom tuberculosis reaches its highest prevalency, is much higher in the cities. Occupation also plays no inconsiderable part in the excessive rate of the cities, as there are more health-injurious occupations engaged in in the cities than in the rural localities. As will be noted, however, there is a downward tendency in the death rates of both the urban and rural localities.

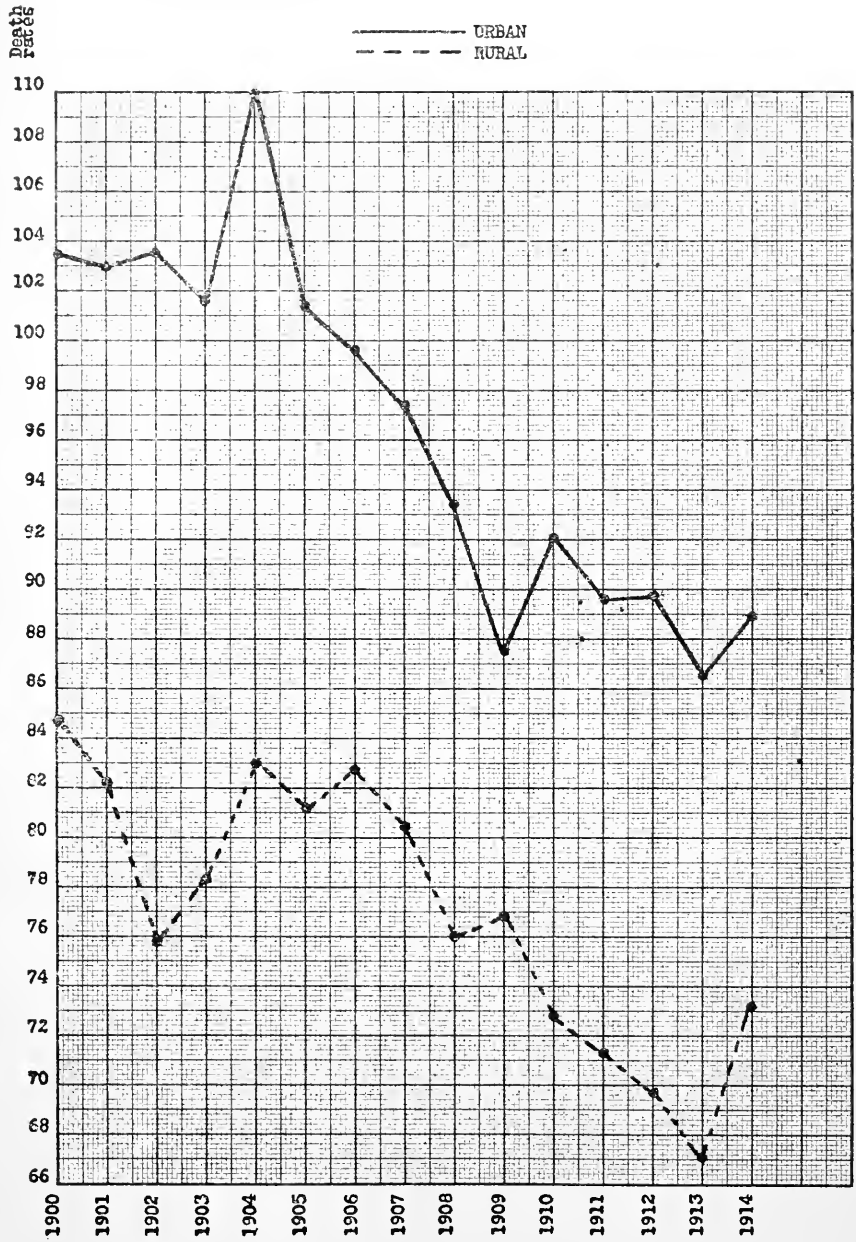
The minimum tuberculosis death rate for the cities occurred in 1913, when it was 86.6 per 100,000 of its population; and the maximum rate was recorded in 1904, when it was 110.1. The minimum rate for the rural localities also occurred in 1913, when it was 67.1; and the maximum rate occurred in 1900, when it was 84.7. The difference in the two rates of the cities represents a decrease of 23.5 deaths per each 100,000 of population, while the difference in the two rates of the rural localities represent a decrease of 20.6 deaths per each 100,000 of their population. The excess in the urban over the rural death rate is not so pronounced in recent years as formerly. For instance, in 1904, when the urban rate reached its maximum, and the rural rate for that year practically equaled its maximum rate, the urban rate represented an excess of 27.1 deaths per each 100,000 of its population, over the rate of the rural localities, while in 1913 this excess amounted to only 19.5 deaths.

TABLE 11.—*The death rates per 100,000 population from pulmonary tuberculosis in the urban and rural localities of Michigan, during each of the years, 1900-1914.*

Years.	Death rates per 100,000 population in—	
	Urban.	Rural.
1900	103.4	84.7
1901	103.1	82.2
1902	103.5	75.9
1903	101.6	78.3
1904	110.1	83.0
1905	101.4	81.2
1906	99.6	82.7
1907	97.5	80.5
1908	93.5	76.0
1909	87.5	76.8
1910	92.1	72.9
1911	89.6	71.3
1912	89.8	69.7
1913	86.6	67.1
1914	89.0	73.2

NOTE.—The term "Urban" as here used is restricted to municipalities having 10,000 or more inhabitants in 1910, smaller places being included with the "Rural districts."

DEATH RATES PER 100,000 POPULATION FROM PULMONARY TUBERCULOSIS IN THE URBAN AND RURAL LOCALITIES OF MICHIGAN DURING THE YEARS, 1900-1914.



SEASONAL FATALITY FROM TUBERCULOSIS.

As indicated by the figures shown in the column captioned "Monthly deaths reduced to a standard of 100," in Table 12, it may be seen that the greatest number of deaths from tuberculosis occurs during the months of from February to May, inclusive, and of these months the greatest number of deaths occur in April.

TABLE 12.—*The seasonal prevalence of pulmonary and other forms of tuberculosis, in Michigan, as indicated by the number of deaths from the two forms of this disease, during each of the months of 1914, and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.				Average, 1898-1913.			
	Pulmonary tuberculosis.		Other forms of tuberculosis.		Pulmonary tuberculosis.		Other forms of tuberculosis.	
	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.
January	193	96.1	31	87.8	193	102.7	35	92.1
February	213	117.5	35	110.5	198	116.5	37	107.9
March	240	119.5	48	137.1	221	117.6	47	123.7
April	236	121.5	41	120.0	220	120.7	42	113.2
May	218	108.6	43	122.9	217	115.4	43	113.2
June	199	102.6	44	128.6	180	97.3	38	102.6
July	191	95.1	42	120.0	171	91.0	38	100.0
August	184	91.6	22	62.9	164	87.2	37	97.4
September	165	85.2	22	63.5	156	85.6	37	100.0
October	171	85.2	33	94.3	167	88.8	33	86.8
November	179	91.6	27	80.0	160	87.0	32	86.8
December	175	87.2	28	80.0	173	92.0	32	84.2
Total	2,364	100.0	416	100.0	2,220	100.0	451	100.0

AGE DISTRIBUTION OF TUBERCULOSIS.

In Table 13 is shown the death rates at each age group per 100,000 population of corresponding age from pulmonary and other forms of tuberculosis. It will be noted that the death rate at practically each age group shows a decline in 1914 compared with the average annual rate for each of the groups.

The death rate from pulmonary tuberculosis at all ages was 79.4 in 1914, while the average annual death rate was 85.0, or which difference represents a decrease of 6.6 per cent in the 1914 rate over that of the average annual rate. At the various age groups the percentage of decrease in the 1914 death rate over that of the average annual rates for each age group is as follows: Under one year of age, 20 per cent; under five years, 22.2; 5–9 years, 19.4; 10-19 years, 21.7; 20-29 years, 23. At the ages of 30-39 years a slight increase in the 1914 rate is noted, but for the ages following this age group a substantial decrease in the rates is again noted.

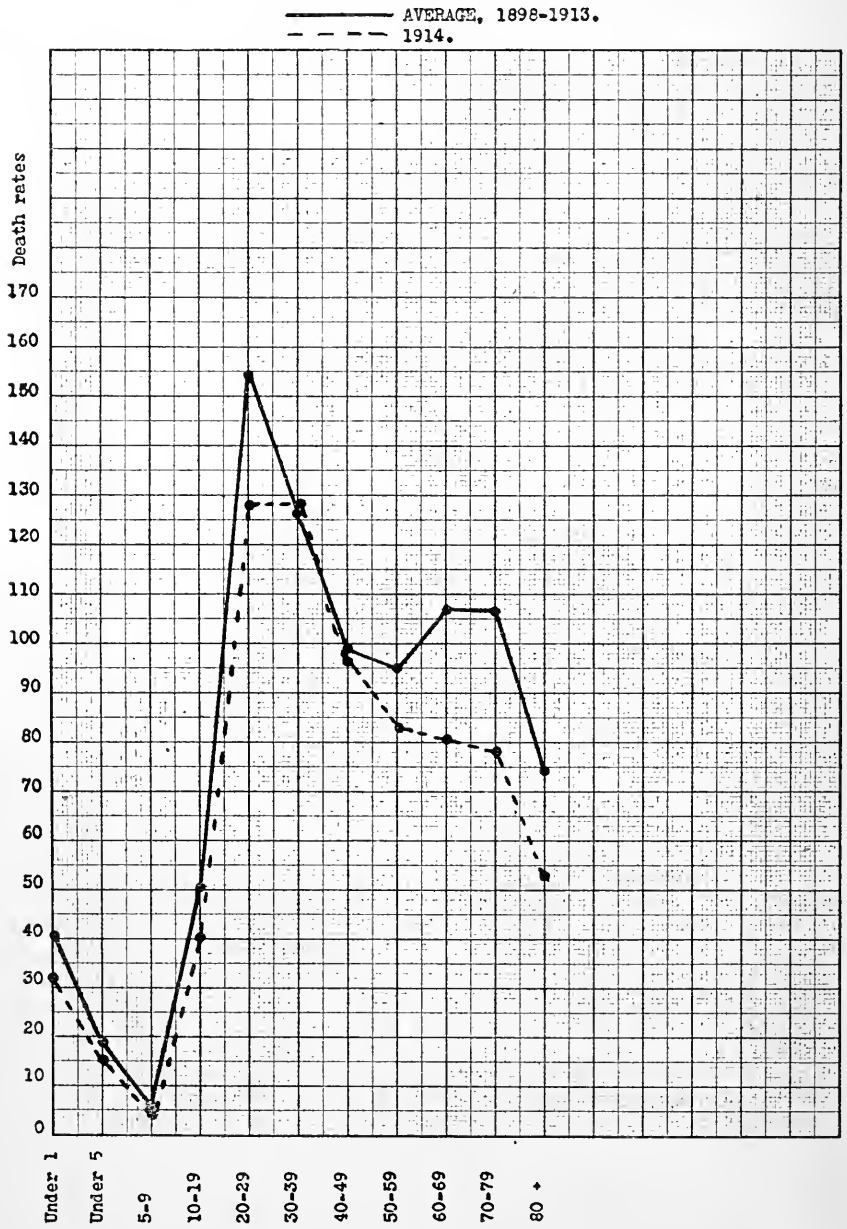
TABLE 13.—*The age distribution of fatal cases of pulmonary and other forms of tuberculosis in Michigan, as indicated by the number of deaths occurring at each age group in 1914 and the average annual number of deaths at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.				Average, 1898-1913.			
	Pulmonary tuberculosis.		Other forms of tuberculosis.		Pulmonary tuberculosis.		Other forms of tuberculosis.	
	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.
ALL AGES	2,298	79.4	416	13.9	2,219	85.0	451	17.3
Under 1 year	21	32.3	38	58.4	24	40.4	42	70.2
Under 5 years	47	14.7	106	33.1	53	18.9	98	34.9
5–9 years	14	5.0	31	11.0	17	6.2	29	10.6
10–19 years	212	39.6	47	8.8	259	50.6	56	11.0
20–29 years	705	128.3	78	14.2	706	154.4	84	18.3
30–39 years	558	128.3	50	11.5	464	125.7	60	16.3
40–49 years	334	96.8	39	11.3	292	99.2	42	14.3
50–59 years	220	83.3	32	12.1	201	95.0	38	18.1
60–69 years	132	80.6	19	11.6	144	107.4	28	20.8
70–79 years	61	78.5	12	15.4	68	107.4	14	21.6
80 years and over	11	52.6	2	9.6	13	74.1	3	16.6
Unknown	4	.....	0	.....	3	.....	*	.....

*Less than one-tenth.

PULMONARY TUBERCULOSIS.

DEATH RATES AT EACH AGE GROUP PER 100,000 POPULATION OF CORRESPONDING AGES, IN MICHIGAN, FOR THE AVERAGE YEAR AND 1914.



SEX DISTRIBUTION OF TUBERCULOSIS.

As may be seen by reference to Table 14, pulmonary tuberculosis, as indicated by the death rates per 100,000 of each sex, is, on the average, more prevalent among the females than males. While this is true on the average for a number of years, still the female death rate has been decreasing each year since 1904 until in 1912 the female rate has fallen below that of the male. It will also be noticed that the female death rate for 1914 is not only the lowest recorded for that sex, but is also lower than any rate registered for the males during any of the years shown in the Table.

As previously stated, the death rate for both sexes and at all ages in 1914 shows a decrease of 6.6 per cent as compared with the average annual death rate, and, as shown in Table 14, the death rate of the males not only increased in 1914, but it was the highest rate recorded for that sex, while the rate for the females shows a large decrease in that year, therefore the decrease of 6.6 per cent in the 1914 rate must be credited to the females.

The death rates from other forms of tuberculosis for each sex have remained practically the same, although in 1914 a slight increase in the female death rate is noticed while the rate for the males remains stationary.

TABLE 14.—*The influence of sex in fatal cases of tuberculosis, in Michigan, as indicated by the number of annual deaths and the death rates per 100,000 population of each sex, during the years, 1898-1914.*

Years.	Pulmonary tuberculosis.				Tuberculosis of other forms.			
	Annual deaths.		Death rates per 100,000 population of each sex.		Annual deaths.		Death rates per 100,000 population of each sex.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1898	963	1,190	78.3	102.6	318	355	25.9	30.6
1899	902	1,196	72.4	101.4	320	276	25.7	23.4
1900	884	1,134	70.8	96.8	227	233	18.2	19.9
1901	958	1,194	75.8	100.6	198	182	15.7	15.3
1902	983	1,105	77.2	92.0	172	185	13.5	15.4
1903	949	1,206	73.8	99.1	199	194	15.5	15.9
1904	1,079	1,227	83.1	99.6	234	207	18.0	16.1
1905	1,142	1,146	87.1	92.0	207	230	15.8	18.5
1906	1,111	1,192	83.9	94.5	212	210	16.0	16.7
1907	1,133	1,205	84.8	94.4	194	189	14.5	14.8
1908	1,086	1,163	80.5	90.1	231	220	17.1	17.0
1909	1,156	1,081	84.9	82.8	202	185	14.8	14.2
1910	1,171	1,102	80.5	81.3	241	242	16.6	17.9
1911	1,180	1,104	79.7	80.2	244	238	16.5	17.3
1912	1,242	1,047	82.4	74.9	244	211	16.2	15.1
1913	1,250	1,023	81.6	72.2	218	202	14.2	14.2
1914	1,359	1,005	87.2	69.2	224	228	14.3	15.8
Annual average...	1,091	1,136	80.4	89.0	229	223	16.8	17.4

PULMONARY TUBERCULOSIS.

DEATH RATES PER 100,000 POPULATION OF EACH SEX, IN MICHIGAN, DURING THE YEARS, 1898-1914.

LOCATION OF THE DISEASE IN TUBERCULOUS PERSONS.

The number of instances in which a statement was made as to the location of the disease in tubercular persons, during the years, 1895-1914, is shown in Table 15. It will be noticed that the disease was located in the thoracic cavity in seven times as many instances as in all the other parts of the body combined.

TABLE 15.—*Location of the disease in tuberculous persons, in Michigan, in the twenty years, 1895-1914.*

Part of body.			Number of instances.
Cranial cavity (meninges and membranes)			678
Spine (vertebrae, cord and membranes)			243
Thoracic cavity	Pharynx	14	43,751
	Larynx	457	
	Bronchi	138	
	Lungs	42,803	
	Pleara	50	
	Instances in which the location of the disease was not specified	289	
Abdominal cavity	Stomach	230	2,997
	Liver	102	
	Kidneys	195	
	Spleen	9	
	Bladder	63	
	Intestines	1,686	
	Peritonaeum	536	
	Instances in which the location of the disease was not specified	176	
Joints	Shoulder	3	305
	Elbow	11	
	Hip	181	
	Knee	73	
	Joints not specified	37	
Instances in which the disease was located in the tissues or other parts of the body but not definitely specified			1,410

RESTRICTIVE AND PREVENTIVE MEASURES IN TUBERCULOSIS.

Table 16 shows the number and per cent of instances in which the restrictive and preventive measures as recommended by this Board were enforced during the years, 1912, 1913 and 1914. The per cent of instances in which these measures were carried out in 1914 shows but a slight improvement over that of former years.

TABLE 16.—*Restrictive and preventive measures in tuberculosis, in Michigan, in the three years, 1912-1914.*

Restrictive and preventive measures.	1914.		1913.		1912.	
	Number of instances.	Per cent.	Number of instances.	Per cent.	Number of instances.	Per cent.
DISINFECTION OF SPUTA:						
Enforced	1,892	*76	1,568	*66	1,506	*67
Neglected	79	*3	54	*2	37	*3
Not stated or statements doubtful	538	*21	705	*32	759	*30
DISINFECTION OF SOILED BEDDING, CLOTHING, ETC:						
Enforced	1,946	70	1,771	69	1,757	65
Neglected	54	2	43	2	33	1
Not stated or statements doubtful	780	28	749	29	903	34
DISINFECTION OF DISCHARGES FROM BOWELS AND BLADDER:						
Enforced	67	†66	69	†61	86	†63
Neglected	5	†5	4	†4	5	†4
Not stated or statements doubtful	29	†29	41	†36	46	†33
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:						
Enforced	1,985	71	1,818	71	1,787	66
Neglected	23	1	23	1	19	1
Not stated or statements doubtful	772	28	722	28	887	33

*In 1914 disinfection of the sputa was not considered necessary in 271 instances; in 1913, 236 instances, and in 1912, 291 instances, in which there was said to be no sputa, or in which the disease was said to be located only in the bowels, stomach, liver, etc.: therefore this number has been deducted from the total number of instances before making the per cent.

†Disinfection of the bowel and bladder discharges was considered necessary in but 101 instances in 1914, 114 instances in 1913, and 137 instances in 1912, i. e., where the disease was located solely, or in combination with some other organ, in the bowels, or in some other part of the body from which infection might leave the body by way of the bowels or bladder.

TYPHOID FEVER IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

As indicated by the death rates per 100,000 population, typhoid fever in this State in 1914 was the least prevalent of any year shown in Table 17.

Compared with the preceding year and with the average annual rate for the five year period 1908-1912, the death rate for 1914 was 27 per cent less than the 1913 rate and 44 per cent less than the average rate for the five year period.

Considered by individual years, or by each of the five year periods shown in the Table, it will be seen that typhoid fever as a cause of death is being reduced to a comparatively negligible quantity. While it is gratifying to note the wonderful reduction in the death rate from this disease, as compared with former years, still there should be no discontinuance in the efforts now being put forth in entirely stamping out this disease in Michigan. The two foremost agencies that tend towards the reduction of the death rate from this disease are the improvement of the insanitary conditions and the public water supplies of the various localities of the State. As proof that the latter mentioned factor is directly responsible for the prevalence of this disease, and by the improvement of which typhoid fever can be practically eliminated, you are referred to Table 19 in which is shown the death rates for certain cities of Michigan. It will be seen that in Port Huron where there occurred on the average of twelve deaths per year from typhoid fever, that there were no deaths recorded from this disease in the year 1914, this being directly due to the fact that their public water supply had been rendered practically pure through certain treatment begun in the year 1912.

What has been stated in regard to Port Huron applies also to the city of Escanaba, in which city the death rate from this disease has been on the average of 143.3 per year, while in 1914 the rate from this disease was only 6.8 per 100,000 population, this great reduction being due to the filtration plant installed in that city in 1909.

TABLE 17.—*The prevalence of typhoid fever, in Michigan, in each of the seventeen years, 1898-1914.*

Years.	*Cases.	Deaths.	Deaths per 100,000 population.
1898	2,874	572	24.3
1899	3,194	580	24.3
1900	5,122	869	35.9
1901	3,002	645	26 3
1902	2,456	608	24.6
Average, 1898-1902	3,330	655	27.1
1903	2,840	606	24.2
1904	3,028	641	25.3
1905	2,774	636	24.9
1906	3,163	721	27.9
1907	1,953	594	22.7
Average, 1903-1907	2,752	640	25.0
1908	2,656	687	26.0
1909	2,694	653	24.5
1910	3,361	654	23.3
1911	2,660	551	19.3
1912	2,847	534	18.4
Average, 1908-1912	2,844	616	22.1
1913	2,253	539	18.3
1914	2,167	396	13.3

*From many localities only the fatal cases were reported, so that the figures in this column do not epresent the number of cases that actually occurred.

GEOGRAPHICAL DISTRIBUTION OF TYPHOID FEVER.

In Table 18 is shown the deaths and death rates per 100,000 population from typhoid fever in each of the four geographical sections of the State.

The death rate from this disease in 1914, compared with the average annual rate for the State, decreased 46 per cent, and by the same comparison a decrease is noted in the rates in each of the geographical sections, and which are as follows: Upper Peninsula, 61 per cent; Northern Counties, 44 per cent; Central Counties, 44 per cent, and the Southern Counties 44 per cent.

It will be noted that the Upper Peninsula section, during the years 1898-1912, had the highest average annual rate of any of the sections, but that in 1914 the Upper Peninsula section had the lowest rate recorded in any of the sections of the State.

The counties showing an unusually high death rate from typhoid fever, in 1914, as compared with the rate for the State for that year (13.3), were: Kalkaska (59.4), Montmorency (51.1), Alpena (44.8), Wexford (27.5), Crawford (25.1), Luce (24.5), Kent (24.3), Bay (23.8), Lapeer (23.7), Huron (23.1), Chippewa (23.0), Midland (22.1), Gogebic (21.9) and Arenac (21.6).

DEATH RATES PER 100,000 POPULATION FROM TYPHOID FEVER, IN MICHIGAN, DURING THE YEARS, 1898-1914.

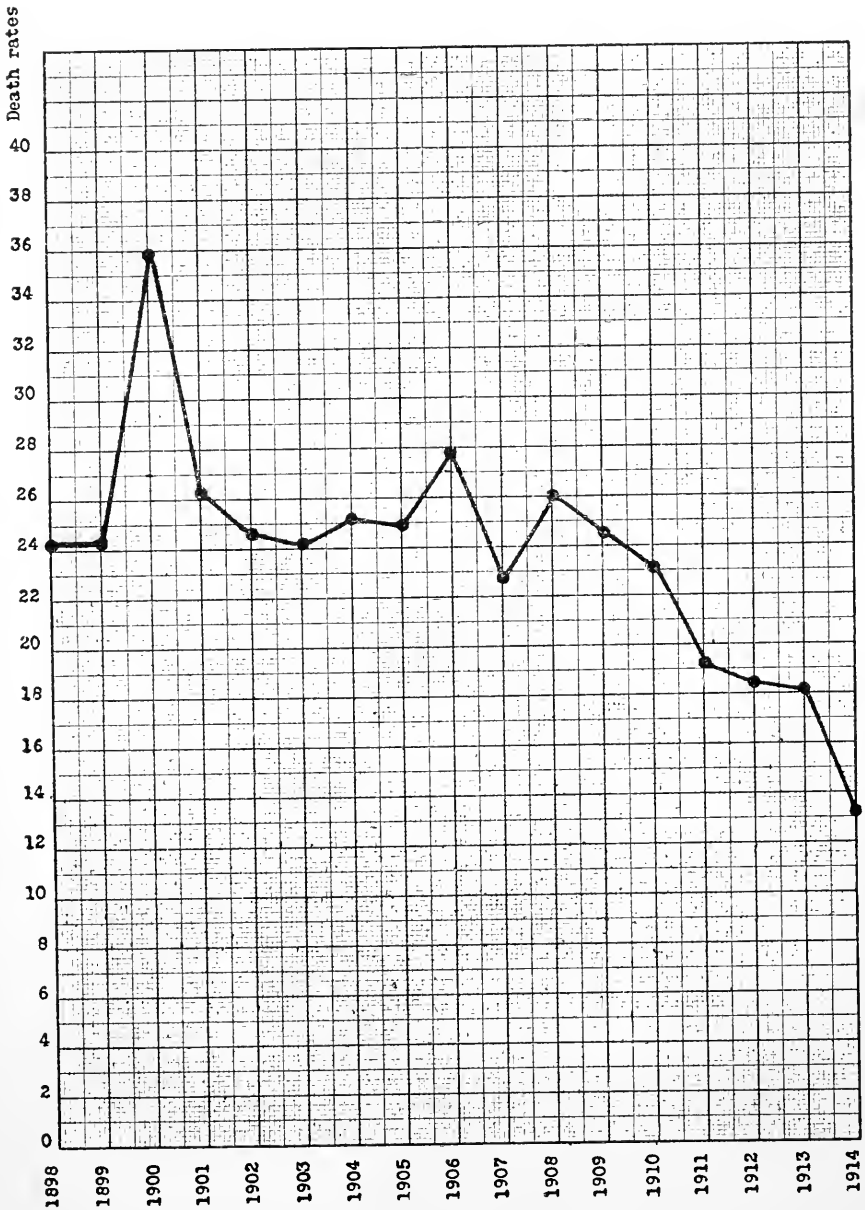


TABLE 18.—*Showing the cases, deaths and death rates per 100,000 population from typhoid fever, in Michigan, and in each of the counties of the State, for the years, 1914 and 1913, also the average for the years, 1898-1912, inclusive.*

State and counties by geographical sections.	1914.			1913.			Average, 1898-1912.		
	Cases.	Deaths.	Deaths per 100,000 population.	Cases.	Deaths.	Deaths per 100,000 population.	Cases.	Deaths.	Deaths per 100,000 population.
STATE OF MICHIGAN	**2,167**	**396**	**13.3**	**2,253**	**539**	**18.3**	**2,976**	**637**	**24.6**
I.—Upper Peninsula	**97**	**40**	**11.1**	**233**	**55**	**15.7**	**335**	**80**	**28.2**
Alger	0	0	.....	54	13	157.7	4	1	22.0
Baraga	0	0	.....	1	1	15.1	5	.6	11.0
Chippewa	17	6	23.0	25	3	11.7	54	10	42.7
Delta	5	4	12.4	14	13	40.1	50	17	61.4
Dickinson	1	1	4.6	7	1	4.7	10	2	10.2
Gogebic	13	6	21.9	5	2	7.6	13	6	30.3
Houghton	16	6	6.0	18	3	3.1	47	13	18.1
Iron	5	3	15.5	32	2	10.9	7	2	18.8
Keweenaw	0	0	.....	0	0	.....	2	.1	2.7
Luce	1	1	24.5	1	1	24.6	4	2	53.1
Mackinac	2	0	.....	2	1	10.3	4	.9	11.2
Marquette	24	8	15.6	57	11	25.9	64	13	30.2
Menominee	11	4	15.9	4	2	7.9	47	10	36.9
Ontonagon	2	1	10.4	10	2	21.3	20	2	28.5
Schoolcraft	0	0	.....	3	0	.....	4	1	13.8
II.—Northern Counties	**319**	**46**	**13.8**	**261**	**62**	**18.7**	**396**	**79**	**24.6**
Alcona	3	0	.....	2	1	17.5	4	.6	10.6
Alpena	150	9	44.8	99	16	79.7	16	6	31.7
Antrim	11	3	19.1	14	5	31.8	21	5	34.1
Arenac	2	2	21.6	3	1	10.7	5	.7	7.4
Benzie	21	1	9.5	18	0	.....	27	2	21.4
Charlevoix	11	4	19.0	8	4	19.4	17	5	23.2
Cheboygan	1	0	.....	3	1	5.5	15	2	14.2
Clare	1	0	.....	1	0	.....	9	2	17.4
Crawford	4	1	25.1	11	0	.....	6	.7	19.5
Emmet	6	3	15.8	3	3	15.8	23	4	25.1
Gladwin	8	0	.....	6	2	24.0	10	1	15.2
Grand Traverse	3	1	4.1	20	6	24.9	51	7	30.4
Iosco	3	0	.....	5	1	10.7	5	2	19.6

Kalkaska	12	5	59.4	8	5	59.9	11	3	33.5
Lake	3	0	.....	1	0	.....	6	1	21.3
Leelanau	2	0	.....	4	0	.....	5	2	15.4
Manistee	8	2	7.6	17	5	18.9	31	7	24.8
Mason	8	3	12.9	8	1	4.4	21	5	24.9
Missaukee	5	2	18.5	0	0	.....	16	2	24.0
Montmorency	4	2	51.1	0	0	.....	3	.8	22.3
Ogemaw	4	1	11.4	1	1	11.4	10	2	22.9
Osceola	0	0	.....	7	1	5.7	20	4	24.1
Oscoda	0	0	.....	0	0	.....	4	*	3.5
Otsego	2	1	16.4	3	2	32.2	16	4	54.0
Presque Isle	24	0	.....	4	1	8.7	13	3	25.0
Roscommon	0	0	.....	1	1	39.3	1	.1	7.5
Wexford	23	6	27.5	14	5	23.2	30	7	35.9
III.—Central Counties	**283**	**60**	**13.0**	**301**	**76**	**15.3**	**446**	**106**	**23.4**
Bay	35	17	23.8	12	9	12.7	54	21	31.6
Gratiot	25	2	7.2	16	1	3.6	44	8	26.5
Huron	24	8	23.1	18	2	5.8	25	5	15.5
Isabella	11	1	4.5	12	2	8.8	32	5	21.7
Mecosta	5	1	5.3	4	4	21.0	20	5	25.7
Midland	13	3	22.1	23	3	21.9	25	5	33.1
Montcalm	23	2	6.4	13	3	9.5	24	7	22.4
Muskegon	11	4	9.4	13	12	28.5	28	8	20.3
Newaygo	3	1	5.1	11	3	15.3	19	5	27.3
Oceana	10	3	15.9	15	5	26.7	19	3	19.4
Saginaw	109	17	18.5	139	24	26.3	85	18	21.3
Sanilac	10	0	.....	13	4	12.0	38	8	22.9
Tuscola	4	1	2.9	12	4	11.6	33	7	19.4
IV.—Southern Counties	**1,468**	**250**	**13.6**	**1,458**	**346**	**19.2**	**1,800**	**371**	**24.3**
Allegan	13	4	9.9	19	3	7.5	27	6	14.8
Barry	18	3	13.0	16	3	13.1	19	3	12.5
Berrien	35	10	17.7	62	11	19.7	47	10	20.2
Branch	6	3	12.0	7	2	7.9	21	4	15.4
Calhoun	23	6	10.2	47	14	23.9	71	13	23.3
Cass	5	3	14.3	9	3	14.3	26	4	20.0
Clinton	3	1	4.6	7	2	9.1	37	6	22.7
Eaton	16	5	16.5	38	5	16.4	51	8	25.2
Genesee	95	14	17.7	56	11	11.9	71	14	30.1
Hillsdale	27	1	3.4	26	4	13.5	28	6	19.7
Ingham	47	7	11.7	59	10	17.2	104	16	34.1
Ionia	12	0	.....	20	4	12.1	34	8	22.3
Jackson	57	8	13.9	22	5	8.8	88	12	25.5
Kalamazoo	24	5	7.4	32	4	6.1	80	11	20.9
Kent	226	42	24.3	173	27	16.1	311	46	32.0
Lapeer	16	6	23.7	9	0	.....	29	6	20.8
Lenawee	15	3	6.4	27	8	16.9	51	11	23.4
Livingston	15	2	11.7	12	2	11.6	28	5	25.9

TABLE 18.—*Concluded.*

State and counties by geographical sections.	1914.			1913.			Average, 1898-1912.		
	Cases.	Deaths.	Deaths per 100,000 population.	Cases.	Deaths.	Deaths per 100,000 population.	Cases.	Deaths.	Deaths per 100,000 population.
Macomb	7	3	9.3	12	2	6.2	41	9	28.7
Monroe	22	3	9.1	23	7	21.3	37	8	22.8
Oakland	17	2	3.8	32	7	13.6	38	9	20.3
Ottawa	25	5	10.6	19	7	15.0	29	8	18.8
St. Clair	55	5	10.0	40	15	29.6	117	21	39.2
St. Joseph	5	1	3.7	7	0	.....	16	3	12.8
Shiawassee	12	1	3.0	15	2	6.1	30	6	19.2
Van Buren	31	2	6.3	30	2	6.2	61	10	29.0
Washtenaw	14	3	6.9	11	2	4.6	35	8	16.8
Wayne	627	102	16.2	628	184	30.5	273	100	24.1

*Less than one-tenth.

TYPHOID FEVER IN CITIES OF 10,000 INHABITANTS AND OVER.

As indicated by the death rates, the prevalence of typhoid fever in cities of Michigan having 10,000 or more inhabitants, is shown in Table 19.

The death rate for 1914, compared with the average annual rate for each of these groups of cities, shows a very substantial decrease, the greatest decrease being in that group of cities whose populations range from 10,000 to 25,000. This decrease in the rate is due, to a very great extent, to the improved water supplies of Escanaba and Port Huron, in which cities the death rates from this disease in former years, were exceptionally high.

The cities having usually high death rates in 1914, as compared with the State for that year were: Alpena (68.8), Ironwood (35.3), Bay City (34.0), Menominee (31.6), Sault Ste. Marie (29.6), Grand Rapids (27.6), Flint (26.2), Saginaw (25.9) and Jackson (20.5).

TABLE 19.—*The cases, deaths and death rates per 100,000 population from typhoid fever, in 1914 and 1913, also the averages of the same for the years, 1904-1912, in cities of Michigan of 10,000 inhabitants and over.*

Cities.	1914.			1913.			Average, 1904-1912.		
	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Cities over 50,000 Inhabitants	**760**	**124**	**17.3**	**727**	**193**	**27.1**	.....	**135**	**24.6**
Detroit	507	76	14.1	475	153	28.3	*492	84	21.4
Grand Rapids	170	34	27.6	150	22	18.2	328	37	35.0
Saginaw	83	14	25.9	102	18	34.3	57	14	28.0
Cities from 25,000 to 50,000 Inhabitants	**234**	**52**	**19.4**	**168**	**44**	**16.6**	.....	**67**	**32.6**
Battle Creek	6	3	10.7	27	12	44.8	38	7	28.1
Bay City	31	16	34.0	9	7	14.8	a	17	41.6
Flint	86	13	26.2	45	7	13.9	v77	12	48.3
Jackson	55	7	20.5	13	4	11.6	68	9	32.4
Kalamazoo	15	2	4.4	25	4	9.0	62	8	22.4
Lansing	32	7	18.7	40	1	2.7	57	9	30.9
Muskegon	9	4	15.7	9	9	35.1	20	5	22.6
Cities from 10,000 to 25,000 Inhabitants	**244**	**31**	**17.4**	**217**	**50**	**28.6**	.....	**80**	**48.7**
Adrian	2	2	17.8	2	2	18.5	a	3	25.4
Alpena	147	9	68.8	88	12	93.3	a	7	54.9
Ann Arbor	6	2	13.4	6	0	.....	10	3	20.4
Escanaba	1	1	6.8	9	9	63.2	a	18	143.3
Ironwood	11	5	35.3	2	1	7.0	a	4	35.6
Ishpeming	3	1	8.3	17	3	23.3	7	1	8.9
Manistee	5	1	8.6	12	5	40.9	14	3	25.5
Marquette	13	2	16.5	19	4	33.6	g34	7	62.3
Menominee	10	3	31.5	3	1	9.8	b	7	69.0
Pontiac	7	1	6.0	14	2	12.2	v40	4	31.3
Port Huron	25	0	.....	10	5	27.4	g58	12	59.9
Sault Ste. Marie	14	4	29.6	25	3	22.7	g24	6	48.9
Traverse City	0	0	.....	10	3	23.9	44	5	40.5

*Three year average.
aFatal cases only reported.
vSeven year average.
gEight year average.
bFour year average.

THE PREVALENCE OF TYPHOID FEVER IN URBAN AND RURAL LOCALITIES.

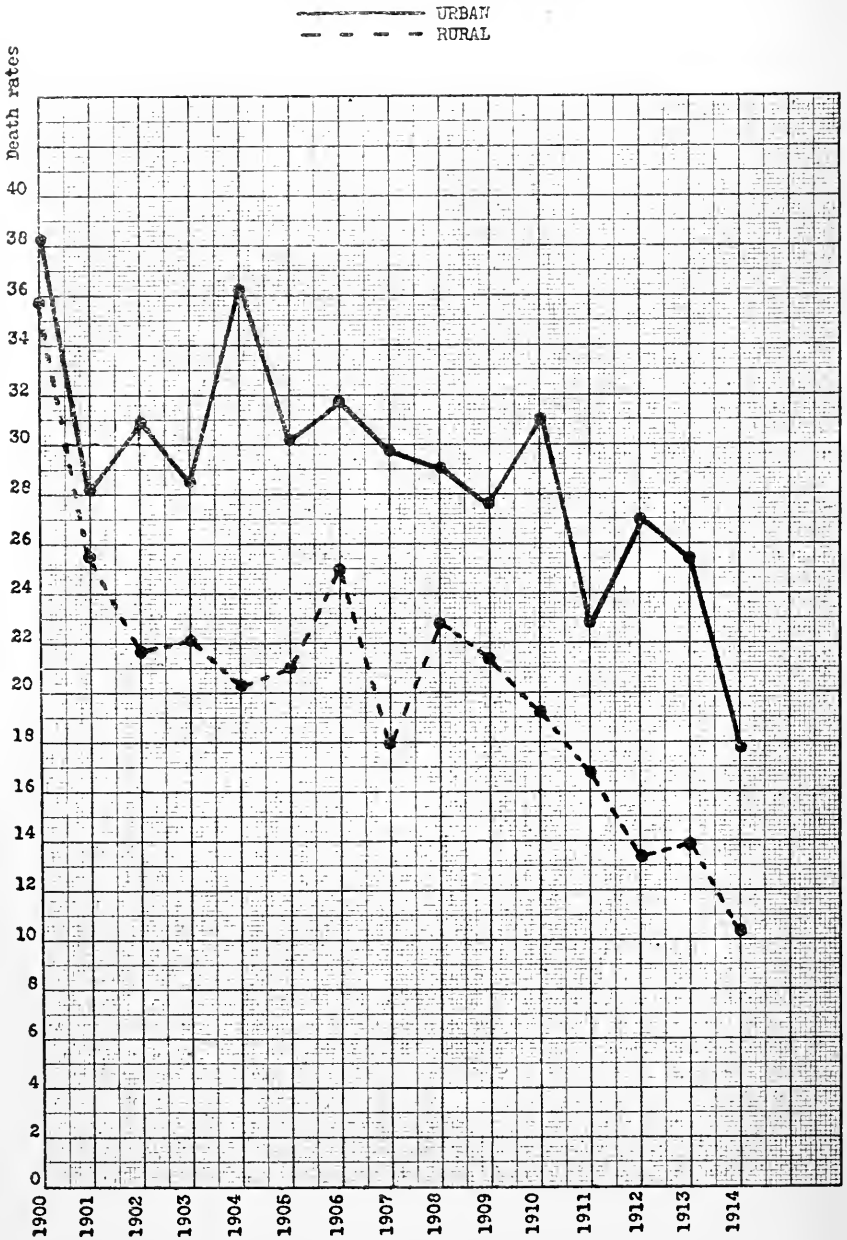
Based on the death rates per 100,000 population of the urban and rural localities, as shown in Table 20, typhoid fever is more prevalent in the urban than in the rural localities. In 1914 the death rates for both the urban and rural localities are the lowest recorded in any year shown in the table. Compared with the rate for the preceding year, the urban rate for 1914 is 30 per cent less, while the rate for the rural districts decreased 25 per cent.

TABLE 20.—*The death rates per 100,000 population from typhoid fever in the urban and rural localities of Michigan, during each of the years, 1900-1914.*

Years.	Death rates per 100,000 population in—	
	Urban.	Rural.
1900	38.2	35.8
1901	28.3	25.5
1902	30.9	21.7
1903	28.6	22.1
1904	36.2	20.3
1905	30.3	21.0
1906	31.7	25.0
1907	29.8	18.0
1908	29.0	22.8
1909	27.7	21.4
1910	31.0	19.3
1911	22.8	16.8
1912	27.0	13.4
1913	25.4	13.9
1914	17.9	10.4

NOTE.—The term "Urban" as here used is restricted to municipalities having 10,000 or more inhabitants in 1910, smaller places being included with the "Rural districts."

DEATH RATES FROM TYPHOID FEVER PER 100,000 POPULATION OF THE URBAN AND RURAL LOCALITIES OF MICHIGAN, FOR THE YEARS, 1900-1914.



SEASONAL PREVALENCE OF TYPHOID FEVER.

The seasonal prevalence of typhoid fever, as indicated by the figures shown in the column captioned "Monthly deaths reduced to a standard of 100." in Table 21, reaches its maximum prevalence during the average years in the month of October, while in 1914 the maximum prevalence occurred one month earlier.

TABLE 21.—*The seasonal prevalence of typhoid fever, in Michigan, as indicated by the number of deaths from this disease in each month in 1914 and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.		Average, 1898-1913.	
	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.
January	31	91.2	43	79.6
February	27	88.2	38	75.9
March	41	120.6	41	75.9
April	30	91.2	39	74.0
May	25	73.5	35	64.8
June	15	47.1	29	55.6
July	31	91.2	35	64.8
August	29	85.3	53	98.1
September	50	152.9	85	163.0
October	38	111.8	100	185.2
November	48	147.1	78	150.0
December	31	91.2	55	101.9
Total	396	100.0	631	100.0

AGE DISTRIBUTION OF TYPHOID FEVER.

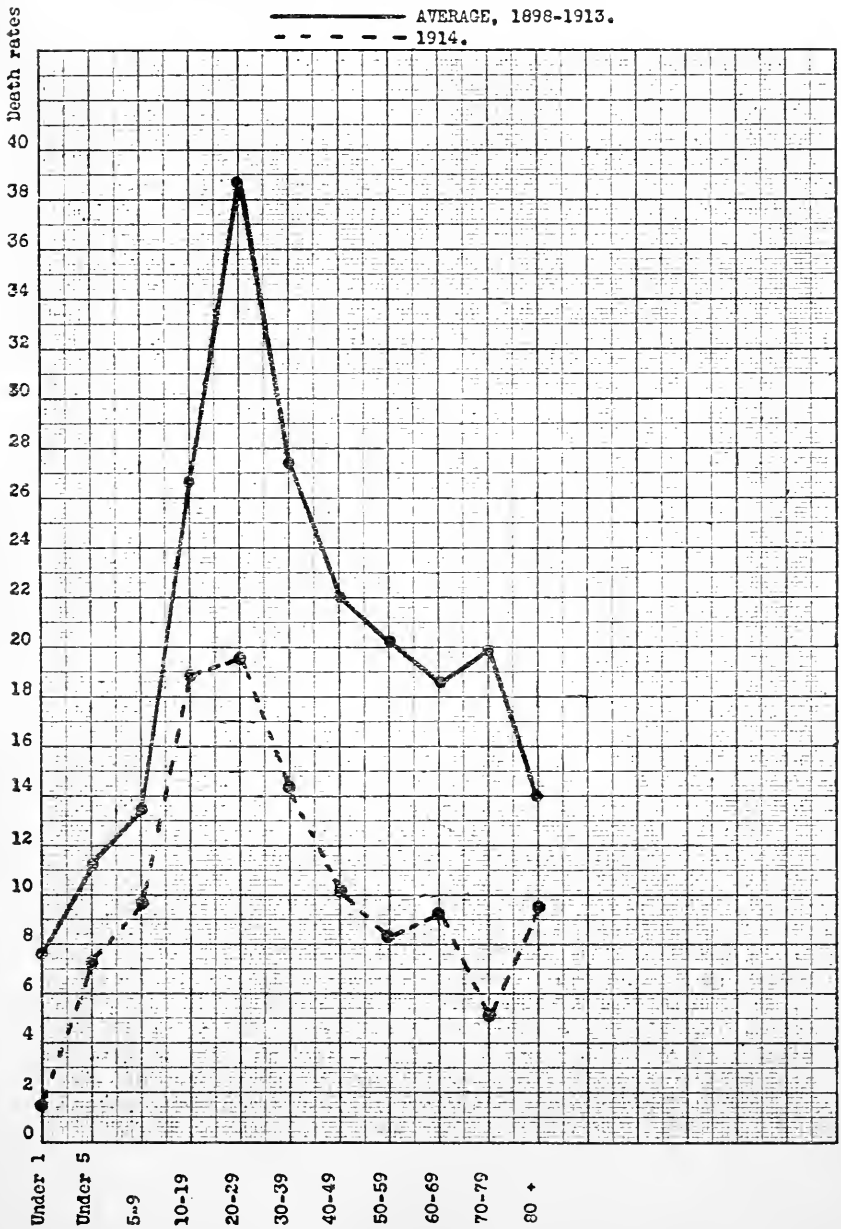
As may be seen by reference to Table 22, the death rate from typhoid fever at all ages shows a decrease in the rate for 1914, of 45 per cent, compared with the average annual rate. By the same comparison the rates at the various age groups in 1914 show the following decreases, expressed in per cent: Under one year of age, 81; under five years, 45; 5-9 years, 28; 10-19 years, 30; 20-29 years, 50; 30-39 years, 48; 40-49 years, 54; 50-59 years, 64; 60-69 years, 51; 70-79 years, 74, and 80 years and over 32.

TABLE 22.—*The age distribution of fatal cases of typhoid fever, in Michigan, as indicated by the number of deaths occurring at each age group in 1914 and the average annual number of deaths at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.		Average, 1898-1913.	
	The total number of deaths during the year 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.
ALL AGES	396	13.3	631	24.2
Under 1 year	1	1.5	5	7.7
Under 5 years	20	6.2	32	11.3
5–9 years	27	9.6	36	13.4
10–19 years	101	18.8	137	26.7
20–29 years	107	19.5	177	38.7
30–39 years	62	14.3	101	27.4
40–49 years	35	10.1	65	22.0
50–59 years	22	8.3	43	20.2
60–69 years	15	9.2	25	18.6
70–79 years	4	5.1	13	19.8
80 years and over	2	9.5	2	14.0
Unknown	1	.....	.7	.....

TYPHOID FEVER.

DEATH RATES AT EACH AGE GROUP PER 100,000 POPULATION OF CORRESPONDING AGES, IN MICHIGAN, FOR THE AVERAGE YEAR AND 1914.



SEX DISTRIBUTION OF TYPHOID FEVER.

As may be seen by Table 23, typhoid fever is more common among males than among females. In 1898 the death rate of the males was 47 per cent higher than the rate for the females for that year. The difference in these rates is becoming gradually less, as in 1913 the excess of the male death rate over that of the female was only 22 per cent, but in 1914 the excess of the male death rate over that of the female increased to 39 per cent.

Girls seem to acquire this disease at an earlier age than boys, so that in the case of children less than fifteen years old, the death rate per 100,000 of their population is greater among the females than among the males. After the fifteenth year of life the death rates of the males are higher at practically each age group than the rates for the females. It seems reasonable to suppose this difference is due to the differences in exposure. In childhood, the difference in the environments of the two sexes is not material; but in middle life, when the activities of life are greatest, it may be supposed to be at its maximum; while in old age, the environments again tend to become similar.

TABLE 23.—*The influence of sex in fatal cases of typhoid fever, in Michigan, as indicated by the number of annual deaths and the death rates per 100,000 population of each sex, during the years, 1898-1914.*

Years.	Annual deaths.		Death rates per 100,000 population of same sex.	
	Males.	Females.	Males.	Females.
1898	348	224	28.3	19.3
1899	313	267	25.1	22.6
1900	510	359	40.8	30.6
1901	389	256	30.8	21.6
1902	351	257	27.6	21.4
1903	338	268	26.3	22.0
1904	357	284	27.5	23.1
1905	368	268	28.1	21.5
1906	417	304	31.4	24.1
1907	364	230	27.2	18.0
1908	404	283	29.9	21.9
1909	403	250	29.6	19.2
1910	399	255	27.4	18.8
1911	332	219	22.4	15.9
1912	312	222	20.7	15.9
1913	307	232	20.0	16.4
1914	238	158	15.3	11.0
Annual averages	361	255	26.6	20.0

RESTRICTIVE AND PREVENTIVE MEASURES IN TYPHOID FEVER.

Table 24 shows the number and per cent of instances in which the local health officers enforced the restrictive and preventive measures in typhoid fever.

In 1914 the placarding of the premises in which the persons suffering from this disease were confined was enforced in 66 per cent of the instances, as compared with 62 per cent in 1913, and 67 per cent for the average years.

The instances in which the sick persons were isolated in 1914 show a decided improvement over 1913 and for the average year, as in 1914 isolation was enforced in 94 per cent of the instances, while in 1913 and for the average year the per cent was 84 and 83, respectively.

The disinfection of the bowel discharges, the most important provision in preventing the spread of this disease, was carried out in 95 per cent of the instances in 1914, 85 in 1913, and 86 for the average year.

The disinfection of the rooms occupied by the patients shows practically the same enforcement of this measure as was said of the bowel discharges.

TABLE 24.—*Restrictive and preventive measures in typhoid fever, in Michigan, in 1914 and 1913, also the average for the years, 1905-1912, inclusive.*

Restrictive and preventive measures.	1914.		1913.		Average, 1905-1912.	
	Cases.	Per cent.	Cases.	Per cent.	Cases.	Per cent.
PLACARDING OF PREMISES:						
Enforced	1,425	66	1,384	62	1,883	67
Neglected, not stated or statements doubtful	742	34	866	38	917	33
ISOLATION OF SICK PERSONS:						
Enforced	2,038	94	1,893	84	2,332	83
Neglected	30	1	50	2	123	5
Not stated or statements doubtful	109	5	307	14	345	12
DISCHARGES FROM THE BOWELS AND BLADDER:						
Disinfected	2,056	95	1,918	85	2,410	86
Not disinfected	11	*	10	*	41	2
Not stated or statements doubtful	100	5	322	14	349	12
CLOTHING AND OTHER ARTICLES SOILED BY DISCHARGES:						
Disinfected	2,058	95	1,933	86	2,441	87
Not disinfected	8	*	4	*	22	1
Not stated or statements doubtful	101	5	313	14	337	12
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:						
Enforced	2,056	95	1,931	86	2,337	84
Neglected	11	*	13	*	94	3
Not stated or statements doubtful	100	5	306	13	369	13

*Less than one per cent.

MENINGITIS IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

As indicated by the death rates per 100,000 population, meningitis is rapidly decreasing in prevalence in this State, the rate for 1914 being the lowest of any year shown in Table 25.

The death rate from this disease in 1914 was 9.9, which, compared with the previous year, shows a decline in the rate, of 18 per cent, and compared with the average rate for the years, 1908-1912, the rate for 1914 shows a 42 per cent reduction.

This disease is essentially one of childhood, as over half the deaths occurring from this disease in Michigan during the years 1899-1914 were among children under five years of age.

The months in which the disease is the most prevalent are March, April and May, and the least prevalent during the months of October, November and December.

TABLE 25.—*The prevalence of meningitis, in Michigan, in each of the seventeen years, 1898-1914.*

Years.	Deaths.	Deaths per 100,000 population.
1898	671	28.4
1899	1,051	44.0
1900	514	21.2
1901	427	17.4
1902	384	15.5
Average, 1898–1902	609	25.1
1903	382	15.3
1904	401	15.8
1905	460	18.0
1906	503	19.5
1907	569	21.8
Average, 1903-1907	463	18.1
1908	480	18.2
1909	468	17.6
1910	526	18.7
1911	487	17.0
1912	423	14.6
Average, 1908–1912	477	17.2
1913	358	12.1
1914	296	9.9

DIPHTHERIA IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

As indicated by the death rates per 100,000 population as shown in Table 26, diphtheria was less prevalent in 1914 than in 1913. In 1913 this disease was unusually prevalent in this State, the rate for that year being 22.9 per 100,000 population, which was the highest rate recorded for any year since 1903. While the death rate for 1914 shows an improvement over that of 1913, still it is some higher than the average annual rate for the five years, 1908-1912.

The fatality rate (deaths per 100 cases) in 1914 was very low, in fact it was the lowest rate experienced during any of the years shown in the Table. Of course this may be due to better reporting on the part of physicians of the non-fatal cases in 1914, as compared with the years preceding.

TABLE 26.—*The prevalence of diphtheria, in Michigan, during the ten years, 1884-1893, and before the use of antitoxin, also a similar statement for the twenty-one years, 1894-1914, since the beginning of the general use of antitoxin.*

Years.	Cases.	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884	3,915	905	23.1	48.8
1885	4,018	964	24.0	50.9
1886	4,244	982	23.1	50.8
1887	3,382	825	24.4	41.8
1888	2,228	532	23.9	26.4
1889	3,157	683	21.6	33.3
1890	4,206	1,050	25.0	50.1
1891	4,385	1,002	22.9	47.0
1892	4,818	1,099	22.8	50.7
1893	4,736	1,092	23.1	49.5
Average, 1884–1893	3,909	913	23.4	44.9
1894	3,852	744	19.3	33.2
1895	3,433	708	20.6	31.2
1896	4,013	757	18.9	32.9
1897	4,132	756	18.3	32.4
Average, 1894–1897	3,858	741	19.2	32.4
1898	2,357	456	19.3	19.4
1899	2,154	435	20.2	18.2
1900	2,706	529	19.5	21.9
1901	2,498	502	20.1	20.5
1902	2,993	504	16.8	20.4
Average, 1898–1902	2,542	485	19.1	20.1
1903	3,670	686	18.7	27.4
1904	3,510	515	14.7	20.4
1905	2,159	478	22.1	18.7
1906	3,648	472	12.9	18.3
1907	2,935	421	14.3	16.1
Average, 1903–1907	3,184	514	16.2	20.1
1908	2,658	343	12.9	13.0
1909	3,109	395	12.7	14.9
1910	3,433	495	14.4	17.6
1911	3,762	473	12.6	16.6
1912	3,294	465	14.1	16.0
Average, 1908–1912	3,251	434	13.4	15.6
1913	5,505	676	12.3	22.9
1914	5,149	512	9.9	17.2

DIPHTHERIA IN CITIES OF MICHIGAN OF 10,000 INHABITANTS AND OVER.

In Table 27 are shown the cases, deaths and death rates per 100,000 population, in cities whose population number 10,000 and over.

As will be seen by the death rates, diphtheria was more prevalent in 1914 compared with the previous year in both groups of cities whose populations range from 10,000 to 50,000. By the same comparison the group having over 50,000 inhabitants shows a decrease of 45 per cent in its rate.

Comparing the 1914 death rate for each of the groups of cities with their average annual rates, it will be seen that they are practically identical. The cities having unusually high death rates from this disease in 1914, compared with the rate for the State for that year (17.2), were: Manistee (69.1), Sault Ste. Marie (51.9), Port Huron (37.4), Pontiac (30.2), Traverse City (30.1), Detroit (29.2), Grand Rapids (26.8) and Flint (24.2).

TABLE 27.—*The cases, deaths and death rates per 100,000 population from diphtheria, in 1914 and 1913, also the averages of the same for the years, 1904-1912, in cities of Michigan of 10,000 inhabitants and over.*

Cities.	1914.			1913.			Average, 1904-1912.		
	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Cities over 50,000 Inhabitants	2,416	195	27.3	3,280	359	50.3	.....	156	28.5
Detroit	1,964	157	29.2	2,720	300	55.6	*1,036	124	31.6
Grand Rapids	282	33	26.8	414	53	43.1	202	21	19.9
Saginaw	170	5	9.3	146	6	11.4	125	11	22.0
Cities from 25,000 to 50,000 Inhabitants	367	35	13.1	269	32	12.0	.....	28	13.6
Battle Creek	53	3	10.7	80	7	26.1	62	4	16.1
Bay City	42	6	12.8	13	2	4.2	46	6	14.7
Flint	166	12	24.2	67	8	15.9	23	3	12.1
Jackson	8	3	8.8	3	3	8.7	43	7	25.2
Kalamazoo	26	4	8.7	44	5	11.3	45	3	8.4
Lansing	42	3	8.0	41	5	13.6	27	3	10.3
Muskegon	30	4	15.7	21	2	7.8	21	2	9.0
Cities from 10,000 to 25,000 Inhabitants	512	41	23.1	300	21	12.0	.....	34.7	21.1
Adrian	0	0	.....	4	2	18.5	11	1	11.4
Alpena	22	0	.....	59	1	7.8	5	3	23.5
Ann Arbor	57	4	26.8	31	1	6.7	12	1	6.8
Escanaba	2	1	6.8	3	3	21.1	30	4	31.8
Ironwood	32	2	14.1	13	0	.....	†	5	44.5
Ishpeming	56	1	8.3	7	2	15.6	60	6	53.3
Manistee	19	8	69.1	20	1	8.2	17	1	8.5
Marquette	3	1	8.3	4	1	8.4	15	2	17.8
Menominee	4	1	10.5	1	0	.....	4	1	9.8
Pontiac	163	5	30.2	41	2	12.2	‡61	2	15.7
Port Huron	74	7	37.4	29	5	27.4	38	5	24.5
Sault Ste. Marie	76	7	51.9	85	3	22.7	12	3	24.4
Traverse City	4	4	30.1	3	0	.....	10	.7	5.7

*Eight years average.
†Fatal cases only reported.
‡Five year average.

THE PREVALENCE OF DIPHTHERIA IN URBAN AND RURAL LOCALITIES.

In Table 28 are shown the death rates from diphtheria per 100,000 population in the urban and rural localities of Michigan. As indicated by the death rates, diphtheria is much more prevalent in the urban than in the rural localities.

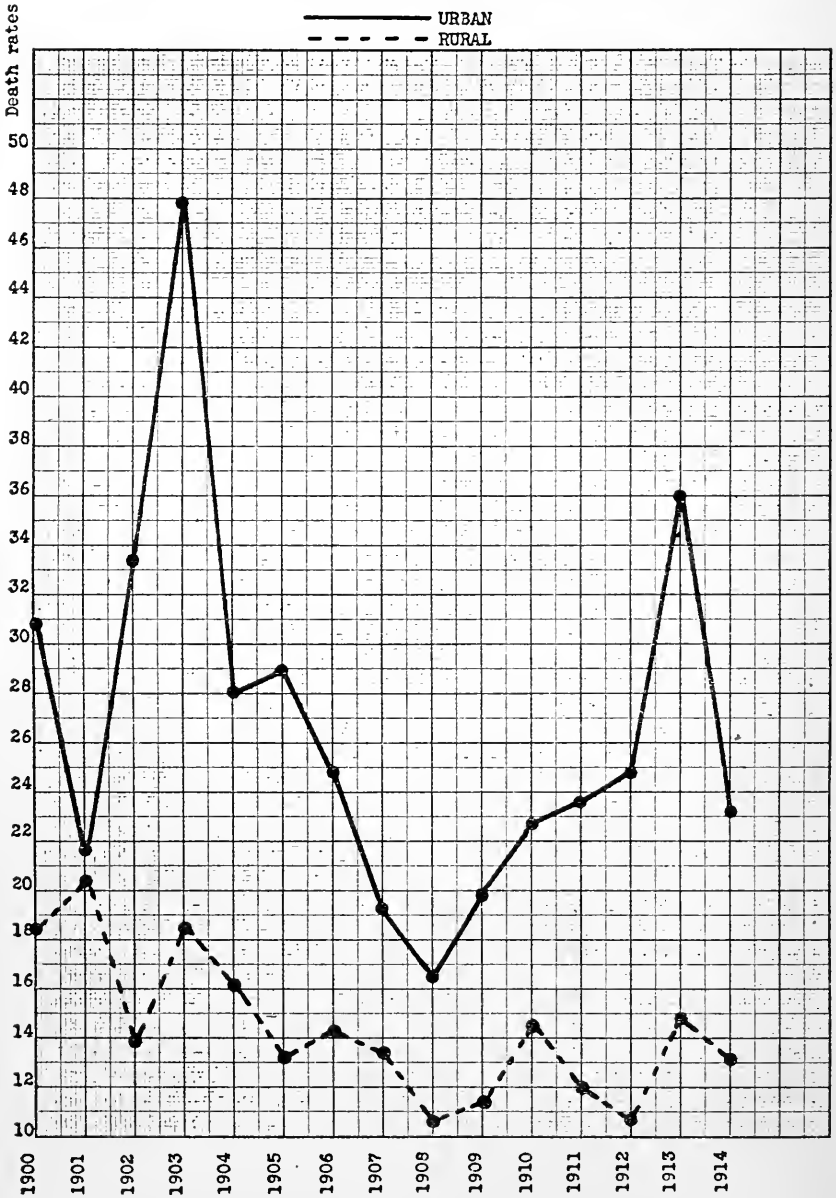
TABLE 28.—*The death rates per 100,000 population from diphtheria in the urban and rural localities of Michigan, during each of the years, 1900-1914.*

Years.	Death rates per 100,000 population in—	
	Urban.	Rural.
1900	30.8	18.5
1901	21.7	20.4
1902	33.5	13.8
1903	47.8	18.4
1904	28.0	16.1
1905	28.9	13.1
1906	24.7	14.2
1907	19.3	13.4
1908	16.4	10.6
1909	19.9	11.4
1910	22.7	14.5
1911	23.7	12.0
1912	24.9	10.7
1913	36.0	14.8
1914	23.3	13.2

NOTE—The term "Urban" as here used is restricted to municipalities having 10,000 or more inhabitants in 1910; smaller places being included with the "Rural districts."

DIPHTHERIA.

DEATH RATES PER 100,000 POPULATION OF THE URBAN AND RURAL LOCALITIES OF MICHIGAN, DURING THE YEARS, 1900-1914.



THE SEASONAL PREVALENCE OF DIPHTHERIA.

As may be seen by Table 29, diphtheria is most prevalent during the months of from October to February inclusive, and least prevalent during the month of July.

TABLE 29.—*The seasonal prevalence of diphtheria, in Michigan, as indicated by the number of deaths from this disease in each month in 1914 and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.		Average, 1898-1913.	
	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.
January	52	110.6	56	133.3
February	62	146.8	42	111.9
March	48	102.1	35	83.3
April	25	55.3	35	85.7
May	30	63.8	32	76.2
June	25	55.3	30	73.8
July	24	51.1	26	61.9
August	33	70.2	27	64.3
September	46	102.1	38	92.8
October	68	144.7	55	131.0
November	48	106.4	60	145.2
December	51	108.5	56	133.3
Total	512	100.0	492	100.0

AGE DISTRIBUTION OF DIPHTHERIA.

The figures contained in Table 30 show the age distribution of those who died from diphtheria, and as will be seen by the death rates per 100,000 living at the same age, this disease is most prevalent among children under ten years of age. Of those under ten years of age, children whose ages range from one to four years, inclusive, are the most susceptible to this disease. It will also be noticed that the rates of those under one year of age and those of from five to nine years of age are practically identical.

The death rates at each age group for 1914, compared with the average annual rate, remain practically the same up to the thirtieth year of age, when a decided increase is noted in the death rate.

TABLE 30.—*The age distribution of fatal cases of diphtheria, in Michigan, as indicated by the number of deaths from this disease occurring at each age group and the death rates per 100,000 population of same age in 1914 and the average number of deaths and death rates at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.		Average, 1898-1913.	
	The total number of deaths during the year 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.
ALL AGES	512	17.2	490	18.5
Under 1 year	35	53.8	32	53.8
Under 5 years	257	80.2	245	87.5
5-9 years	148	52.7	149	55.4
10-19 years	63	11.8	70	13.7
20-29 years	18	3.3	14	3.0
30-39 years	10	2.3	5	1.4
40-49 years	9	2.6	4	1.3
50-59	6	2.3	2	0.8
60-69 years	0	.....	.6	0.5
70-79 years	0	.....	.4	0.6
80 years and over	0	.....	.2	2.2
Unknown	1	.....	.2	.....

WHOOPING COUGH IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1914 there were reported to this board 1,822 cases of whooping cough, of which number 290 or 15.9 per cent proved fatal. The death rate from this disease in 1914 was practically the same as for the preceding year, although as indicated by the figures in the column captioned "deaths per 100 Cases," the disease was less fatal in 1914. Compared with the average rate for the five years preceding 1913, it will be seen that the rate for 1914 is the same.

TABLE 31.—*The prevalence of whooping-cough, in Michigan, in each of the twenty-nine years, 1886-1914.*

Years.	*Cases.	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1886	2,642	62	2.3	3.2
1887	2,267	59	2.6	2.0
1888	2,502	49	2.0	2.4
1889	2,694	41	1.5	2.0
1890	983	20	2.0	1.0
1891	2,360	101	4.3	4.7
1892	3,188	77	2.4	3.6
1893	4,047	134	3.3	6.1
1894	4,555	123	2.7	5.5
1895	4,284	109	2.5	4.8
1896	5,466	91	1.7	4.0
1897	3,978	72	1.8	3.1
Average, 1886–1897	3,247	78	2.4	3.6
1898	5,300	282	5.3	12.0
1899	6,509	238	3.7	10.0
1900	3,397	208	6.1	8.6
1901	2,955	163	5.5	6.7
1902	3,534	289	8.2	11.7
Average, 1898-1902	4,339	236	5.4	9.8
1903	4,172	383	9.2	15.3
1904	1,779	148	8.3	5.8
1905	1,196	131	11.0	5.1
1906	1,364	469	34.4	18.1
1907	872	223	25.6	8.5
Average, 1903-1907	1,877	271	14.4	10.6
1908	1,248	305	24.4	11.6
1909	1,054	217	20.6	8.1
1910	1,136	318	28.0	11.3
1911	1,897	254	13.4	8.9
1912	1,255	252	20.0	8.7
Average, 1908-1912	1,318	269	20.4	9.7
1913	929	276	29.7	9.3
1914	1,822	290	15.9	9.7

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

THE SEASONAL PREVALENCE OF WHOOPING COUGH.

As will be seen by reference to Table 32, whooping cough, on the average, reaches its maximum prevalency during the months of from March to May, inclusive, and the minimum prevalency during September and October. In 1914 this disease was most prevalent during the months of from January to June, inclusive, and during these months the maximum of prevalency occurred during the month of May, while the minimum of prevalency was in December.

TABLE 32.—*The seasonal prevalence of whooping-cough, in Michigan, as indicated by the number of deaths from this disease in each month in 1914 and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.		Average, 1898-1913.	
	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.
January	30	120.0	18	81.8
February	29	124.0	21	104.5
March	33	132.0	27	122.7
April	26	120.0	26	122.7
May	36	144.0	27	122.7
June	31	124.0	21	100.0
July	18	72.0	26	118.2
August	29	116.0	26	118.2
September	15	64.0	21	100.0
October	14	56.0	15	68.2
November	18	76.0	15	68.2
December	11	44.0	17	77.3
Total	290	100.0	260	100.0

AGE DISTRIBUTION OF WHOOPING COUGH.

Whooping cough, as indicated by the death rates shown in Table 33, demands its greatest toll from among children of under one year of age. The death rate at this age in 1914, shows a slight increase over the average annual rate, while the rate for those under five years and from five to nine years of age shows a very slight decrease in 1914 compared with the average rates at these ages.

TABLE 33.—*The age distribution of fatal cases of whooping-cough, in Michigan, as indicated by the number of deaths and the death rates per 100,000 population from this disease at each age group in 1914 and the average number of deaths and death rates at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.		Average, 1898-1913.	
	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898–1913.	Death rates per 100,000 population of same age.
ALL AGES	290	9.7	260	9.9
Under 1 year	181	278.2	164	273.7
Under 5 years	282	88.0	249	89.0
5–9 years	5	1.8	8	3.0
10–19 years	2	0.4	2	0.3
20 years and over	1	0.05	1	0.06

SCARLET FEVER IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1914 there were reported to this department 3,769 cases of scarlet fever, of which number 179 or 4.7 per cent proved fatal. This number of deaths corresponds to an annual death rate of 6.0 per 100,000 population, and which is the lowest death rate recorded in this State since 1899, while the reported cases were less in 1914 than that of any year since 1908.

TABLE 34.—*The prevalence of scarlet fever, in Michigan, in each of the thirty-one years, 1884-1914.*

Years.	*Cases.	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884	2,476	230	9.3	12.4
1885	2,750	187	6.8	9.9
1886	3,046	275	9.0	14.2
1887	3,400	314	9.2	15.9
1888	2,989	200	6.7	9.9
1889	3,535	166	4.7	8.1
1890	3,835	162	4.2	7.7
1891	6,212	286	4.6	13.4
1892	7,075	487	6.9	22.5
1893	6,065	415	6.8	18.5
1894	5,500	203	3.7	9.1
1895	3,908	125	3.2	5.5
1896	2,646	81	3.1	3.9
1897	2,482	115	4.6	4.9
Average, 1884-1897	3,994	232	5.8	11.0
1898	2,409	91	3.8	3.9
1899	4,345	144	3.3	6.0
1900	6,734	272	4.0	11.2
1901	7,726	312	4.0	12.7
1902	6,582	277	4.2	11.2
Average, 1898-1902	5,559	219	3.9	9.1
1903	5,353	200	3.7	8.0
1904	4,088	210	5.1	8.3
1905	2,286	123	5.4	4.8
1906	3,066	227	7.4	8.8
1907	2,514	159	6.3	6.1
Average, 1903-1907	3,461	184	5.3	7.2
1908	3,087	194	6.3	7.4
1909	5,153	275	5.3	10.3
1910	6,501	297	4.6	10.6
1911	5,177	208	4.0	7.3
1912	4,533	186	4.1	6.4
Average, 1908-1912	4,890	232	4.7	8.4
1913	4,140	281	6.8	9.5
1914	3,769	179	4.7	6.0

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

SCARLET FEVER IN CITIES OF MICHIGAN OF 10,000 INHABITANTS AND OVER.

As indicated by the death rates as shown in Table 35, scarlet fever seems to be the most prevalent in the cities having the greatest number of inhabitants. The death rate for each group of cities for 1914 shows a decided decrease compared with the rate for the preceding year and with the average annual rate for the years, 1904-1912.

The cities having unusually high death rates in 1914 compared with the rate for the entire State for that year (6.0) were: Ironwood (42.4), Grand Rapids (17.9), Marquette (16.5), Alpena (15.3), and Ann Arbor (13.4).

TABLE 35.—*The cases, deaths and death rates per 100,000 population from scarlet fever, in 1914 and 1913, also the averages of the same for the years, 1904-1912, in cities of Michigan of 10,000 inhabitants and over.*

Cities.	1914.			1913.			Average, 1904-1912.		
	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Cities over 50,000 Inhabitants	1,414	79	11.1	1,974	137	19.2	.....	79	14.4
Detroit	950	52	9.7	1,415	111	20.6	869	69	17.6
Grand Rapids	320	22	17.9	378	22	18.2	356	9	8.5
Saginaw	144	5	9.3	181	4	7.6	60	1	2.0
Cities from 25,000 to 50,000 Inhabitants	280	4	1.5	181	10	3.8	.....	13.9	6.8
Battle Creek	64	2	7.1	60	1	3.7	47	.3	1.2
Bay City	61	0	.....	2	0	.....	206	7	17.1
Flint	53	0	.....	48	4	7.9	44	1	4.0
Jackson	0	0	.....	6	3	8.7	81	1	3.6
Kalamazoo	26	0	.....	25	1	2.3	76	3	8.4
Lansing	63	2	5.3	11	0	.....	17	.6	2.1
Muskegon	13	0	.....	29	1	3.9	70	1	4.5
Cities from 10,000 to 25,000 Inhabitants	240	13	7.3	192	13	7.4	.....	11.3	6.9
Adrian	0	0	.....	1	1	9.3	4	.4	3.8
Alpena	79	2	15.3	36	0	.....	1	.1	0.6
Ann Arbor	43	2	13.4	24	2	13.4	18	0	.....
Escanaba	0	0	.....	3	1	7.0	17	.9	7.2
Ironwood	53	6	42.4	12	1	7.0	*	3	26.7
Ishpeming	10	0	.....	4	0	.....	34	2	17.8
Manistee	0	0	.....	65	4	32.7	32	1	8.5
Marquette	9	2	16.5	12	2	16.8	17	1	8.9
Menominee	0	0	.....	0	0	.....	13	.6	5.9
Pontiac	26	0	.....	9	1	6.1	21	.9	7.0
Port Huron	13	0	.....	2	0	.....	31	.7	3.5
Sault Ste. Marie	7	1	7.4	10	1	7.6	9	.3	2.4
Traverse City	0	0	.....	14	0	.....	24	.4	3.2

*Fatal cases only reported.

THE PREVALENCE OF SCARLET FEVER IN URBAN AND RURAL LOCALITIES.

Table 36 shows the death rates per 100,000 population in the urban and rural localities of Michigan.

This disease, as indicated by the death rates, is considerably more prevalent in the urban than rural localities, the rate for the former being 79 per cent higher than the rural rate in 1914.

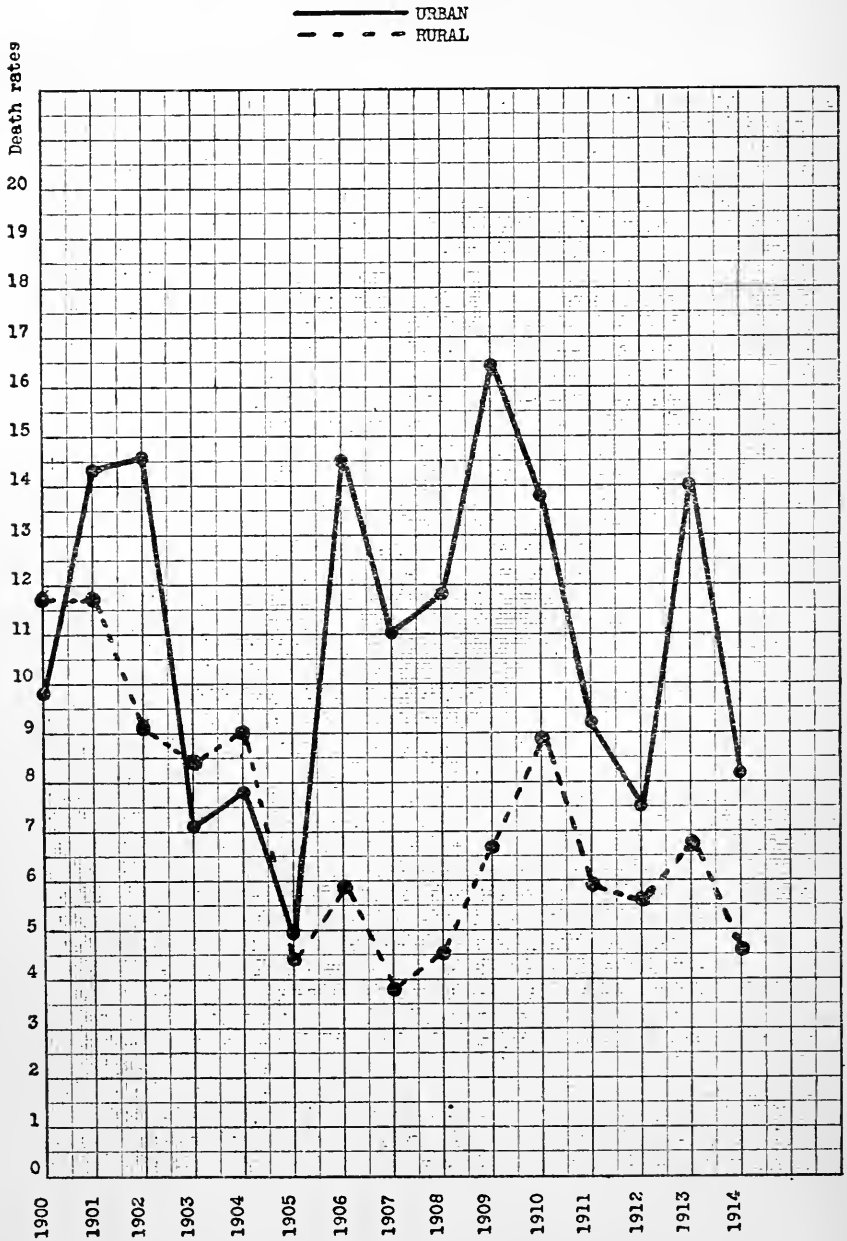
While the death rates in both localities fluctuate from year to year, still the prevalence of this disease seems to be on the downward trend in the rural localities while the rate in the urban localities seems to be stationary.

TABLE 36.—*The death rates per 100,000 population from scarlet fever in the urban and rural localities, of Michigan, during each of the years, 1900-1914.*

Years.	Death rates per 100,000 population in—	
	Urban.	Rural.
1900	9.8	11.7
1901	14.3	11.7
1902	14.5	9.1
1903	7.1	8.4
1904	7.8	8.5
1905	4.9	4.4
1906	14.5	5.9
1907	11.0	3.8
1908	11.8	4.5
1909	16.4	6.7
1910	13.8	8.9
1911	9.2	5.9
1912	7.5	5.6
1913	14.0	6.7
1914	8.2	4.6

NOTE.—The term "Urban" as here used is restricted to municipalities having 10,000 or more inhabitants in 1910; smaller places being included with the "Rural districts."

DEATH RATES PER 100,000 POPULATION FROM SCARLET FEVER IN THE URBAN AND RURAL LOCALITIES OF MICHIGAN, DURING THE YEARS, 1900-1914.



THE SEASONAL PREVALENCE OF SCARLET FEVER.

As indicated by the figures shown in Table 37, scarlet fever, on the average, is most prevalent during the months of from November to May, inclusive, and of these months the maximum occurs in March. The month in which the prevalence reaches the minimum is September. What is true on the average applies also to the conditions in 1914, except that in that year scarlet fever reached the maximum in May instead of March and the month in which the disease was least prevalent was June, while for the average year September is the month of least prevalency.

TABLE 37.—*The seasonal prevalence of scarlet fever, in Michigan, as indicated by the number of deaths from this disease in each month in 1914 and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.		Average, 1898-1913.	
	The number of deaths occurring in each month during the year, 1914.	Monthly deaths reduced to a standard of 100.	Average number of deaths occurring in each month during the years, 1898-1913.	Monthly deaths reduced to a standard of 100.
January	19	126.7	26	144.4
February	19	140.0	23	138.9
March	20	133.3	27	150.0
April	18	126.7	22	127.8
May	22	146.7	21	116.7
June	5	33.3	14	77.8
July	10	66.7	10	55.6
August	9	60.0	10	55.6
September	8	53.3	9	50.0
October	10	66.7	14	77.8
November	20	140.0	19	105.6
December	19	126.7	22	122.2
Total	179	100.0	217	100.0

AGE DISTRIBUTION OF SCARLET FEVER.

By reference to Table 38 it may be seen that scarlet fever is a disease confined mostly to children under ten years of age, although deaths are recorded at each age group throughout the entire lifetime.

It will be noticed that the death rate in 1914 was considerably less than the average annual rate at all ages. The decline in the 1914 rate was due to the decline in the rate of those children under five years of age, the rates for those of five years and over remaining practically stationary.

TABLE 38 —*The age distribution of fatal cases of scarlet fever, in Michigan, as indicated by the number of deaths and the death rates per 100,000 population from this disease at each age group in 1914, and the average number of deaths and death rates at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.		Average, 1898-1913.	
	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.
ALL AGES	179	6.0	216	8.3
Under 1 year	9	13.8	15	25.5
Under 5 years	79	24.6	120	42.9
5–9 years	62	22.1	61	22.5
10–19 years	26	4.9	24	4.6
20–29 years	8	1.5	7	1.6
30–39 years	2	0.5	3	0.7
40–49 years	2	0.6	.8	0.3
50–59 years	0	.....	.3	0.1
60–69 years	0	.....	.1	0.09
70–79 years	0	.....	0	.....
80 years and over	0	.....	.1	0.7
Unknown	0	.....	.2	.....

MEASLES IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1914, there were reported to this department 11,356 cases, including 177 deaths from measles. These cases represent the greatest number reported in any one year since 1910. The number of fatal cases of measles corresponds to an annual death rate of 5.9 per 100,000 population, and which rate is 31 per cent less than the rate for the preceding year.

TABLE 39.—*The prevalence of measles, in Michigan, during each of the twenty-five years, 1890-1914.*

Years.	*Cases.	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1890	11,911	140	1.2	6.7
1891	12,173	149	1.2	7.0
1892	3,830	76	2.0	3.5
1893	7,334	119	1.6	5.4
1894	10,518	55	.5	2.5
1895	3,870	12	.3	.5
1896	15,409	156	1.0	6.8
1897	32,543	159	.5	6.8
Average, 1890–1897	12,199	108	.9	4.9
1898	11,614	131	1.1	5.6
1899	12,005	187	1.6	7.8
1900	20,403	342	1.7	14.1
1901	4,629	79	1.7	3.2
1902	11,978	238	2.0	9.6
Average, 1898–1902	12,126	195	1.6	8.1
1903	8,941	176	2.0	7.0
1904	10,386	194	1.9	7.7
1905	6,061	123	2.0	4.8
1906	7,403	251	3.4	9.7
1907	12,139	256	2.1	9.8
Average, 1903–1907	8,986	200	2.2	7.8
1908	4,775	121	2.5	4.6
1909	9,047	270	3.0	10.1
1910	13,934	251	1.8	8.9
1911	9,639	200	2.1	7.0
1912	2,834	118	4.2	4.1
Average, 1908–1912	8,046	192	2.4	6.9
1913	9,185	253	2.8	8.6
1914	11,356	177	1.6	5.9

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

MEASLES IN CITIES OF 10,000 INHABITANTS AND OVER.

In Table 40 may be seen the prevalence of Measles in cities of Michigan having 10,000 or more inhabitants during the years 1914 and 1913, and the average annual rates for the years, 1904-1912.

The cities having unusually high death rates from this disease in 1914 as compared with the rate for the State for that year (5.9) were: Marquette (16.5), Kalamazoo (15.3), Traverse City (15.1), Battle Creek (14.2) and Muskegon (11.8).

TABLE 40.—*The deaths and death rates per 100,000 population from measles, in 1914 and 1913, also the averages for the years, 1904-1912, in cities of Michigan, of 10,000 inhabitants and over.*

Cities.	1914.		1913.		Average, 1904-1912.	
	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.	Deaths.	Deaths per 100,000 inhabitants.
Cities over 50,000 Inhabitants	**47**	**6.6**	**123**	**17.2**	**47**	**8.6**
Detroit	41	7.6	106	19.6	40	10.2
Grand Rapids	5	4.1	11	9.1	5	4.7
Saginaw	1	1.9	6	11.4	2	4.0
Cities from 25,000 to 50,000 Inhabitants	**19**	**7.1**	**16**	**6.0**	**16**	**7.8**
Battle Creek	4	14.2	.....	.....	3	12.0
Bay City	.....	.....	8	16.9	7	17.1
Flint	4	8.1	.....	.....	2	8.1
Jackson	1	2.9	6	17.4	.6	2.2
Kalamazoo	7	15.3	.....	.....	2	5.6
Lansing	.....	.....	2	5.4	1	3.4
Muskegon	3	11.8	.....	.....	.4	3.4
Cities from 10,000 to 25,000 Inhabitants	**6**	**3.4**	**17**	**9.7**	**9.9**	**6.0**
Adrian	.....	.....	.....	.....	.4	3.8
Alpena	.....	.....	.....	.....	1	7.8
Ann Arbor	.....	.....	.....	.....	.4	2.7
Escanaba	.....	.....	4	28.1	.6	4.8
Ironwood	1	7.1	2	14.1	.8	7.1
Ishpeming	.....	.....	3	23.3	2	17.8
Manistee	.....	.....	1	8.2	.4	3.4
Marquette	2	16.5	.....	.....	.6	5.3
Menominee	.....	.....	.....	.....	.6	5.9
Pontiac	.....	.....	5	30.6	.7	5.5
Port Huron	1	5.3	2	10.9	.9	4.5
Sault Ste. Marie	.....	.....	.....	.....	.8	6.5
Traverse City	2	15.1	.....	.....	.7	5.7

THE SEASONAL PREVALENCE OF MEASLES.

The months in which measles is most prevalent are shown in Table 41. On the average measles is most prevalent during the months of from March to June, while in 1914 the disease was most prevalent from February to June, inclusive, or one month earlier than on the average. The month in which the prevalency reached the minimum in both 1914, and for the average year, was October.

TABLE 41.—*The seasonal prevalence of measles, in Michigan, as indicated by the number of deaths from this disease in each month in 1914 and the average number of deaths in each month during the years, 1898-1913.*

Month.	1914.		Average, 1898-1913.	
	The number of deaths occurring in each month during the year 1914.	Monthly deaths reduced to a standard of 100	Average number of deaths occurring in each month during the years 1898-1913.	Monthly deaths reduced to a standard of 100.
January	12	80.0	17	100.0
February	33	246.7	17	105.9
March	29	193.3	28	164.7
April	25	173.3	31	188.2
May	33	220.0	34	200.0
June	18	126.7	23	141.2
July	11	73.3	15	88.2
August	3	20.0	7	41.2
September	2	13.3	3	17.6
October	0	.....	5	29.4
November	3	20.0	8	47.1
December	8	53.3	12	70.6
Total	177	100.0	200	100.0

AGE DISTRIBUTION OF MEASLES.

As indicated by the death rates per 100,000 population at each age group, measles is most prevalent among children under five years of age. Of the children under five years, those under one year of age are the most susceptible to this disease, their death rate being almost twice as large as those whose ages range from one to four years, inclusive. Beginning the fifth year of age, the death rate decreases very rapidly. It will be noted, however, that all persons regardless of age, are liable to contract measles.

TABLE 42.—*The age distribution of fatal cases of measles, in Michigan, as indicated by the number of deaths and the death rates per 100,000 population from this disease at each age group in 1914, and the average number of deaths and death rates at each age group during the years, 1898-1913, inclusive.*

Age groups.	1914.		Average, 1898-1913.	
	The total number of deaths during the year, 1914.	Death rates per 100,000 population of same age.	Average annual number of deaths during the years, 1898-1913.	Death rates per 100,000 population of same age.
ALL AGES	177	5.9	199	7.6
Under 1 year	54	83.0	51	84.4
Under 5 years	143	44.6	147	52.6
5–9 years	14	5.0	20	7.5
10–19 years	10	1.9	14	2.7
20–29 years	4	0.7	7	1.6
30–39 years	2	0.5	5	1.4
40–49 years	0	.....	3	1.1
50–59 years	2	0.8	1	0.6
60–69 years	0	.....	.4	0.3
70–79 years	2	2.6	.6	0.9
80 years and over	0	.....	.2	1.1
Unknown	0	.....	.2	.....

SMALLPOX IN MICHIGAN IN 1914 AND PRECEDING YEARS.

GENERAL PREVALENCE.

The prevalence of smallpox in Michigan for 1914 and preceding years is shown in Table 43.

Based on the death rates per 100,000 population, smallpox was less prevalent in Michigan in 1914 than in any year since 1897.

TABLE 43.—*The prevalence of smallpox, in Michigan, during the thirty-three years, 1882-1914.*

Years.	Cases.	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1882	589	159	27.0	9.1
1883	29	2	6.9	.1
1884	22	3	13.6	.2
1885	27	6	22.2	.3
1886	24	7	29.2	.4
1887	4	0	.....	.....
1888	42	6	14.3	.3
1889	57	4	7.0	.2
1890	2	0	.....	.....
1891	3	0	.....	.....
1892	1	1	100.0	.05
1893	10	3	30.0	.1
1894	285	60	21.1	2.7
1895	187	47	25.1	2.1
1896	38	16	42.1	.7
1897	15	0	.....	.....
Average, 1882-1897	83	19	23.5	1.0
1898	32	1	3.1	.04
1899	139	6	4.3	.3
1900	694	9	1.3	.4
1901	5,088	31	.6	1.3
1902	7,086	40	.6	1.6
Average, 1898-1902	2,608	17	.7	.7
1903	6,341	33	.5	1.3
1904	5,753	24	.4	.9
1905	2,985	74	2.5	2.9
1906	1,240	3	.2	.1
1907	1,712	8	.5	.3
Average, 1903-1907	3,606	28	.8	1.1
1908	2,306	8	.3	.3
1909	1,533	4	.3	.2
1910	3,319	120	3.6	4.3
1911	898	9	1.0	.3
1912	1,127	3	.3	.1
Average, 1908-1912	1,837	29	1.6	1.0
1913	1,995	4	.2	.1
1914	1,527	1	.07	.03

ACUTE ANTERIOR POLIOMYELITIS (INFANTILE PARALYSIS) IN MICHIGAN IN 1914 AND PRECEDING YEARS.

The following table shows the general prevalence of the disease during the five years, 1910-1914:

Years.	Cases.	Deaths.	Deaths per 100,000 population.
1910	104	72	2.6
1911	68	35	1.2
1912	78	33	1.1
1913	56	29	1.0
1914	49	28	0.9

CHICKEN-POX ((VARICELLA) IN MICHIGAN IN 1914.

During the year 1914, 551 cases of chicken-pox were reported to this department, no deaths resulting.

ERYSIPELAS IN MICHIGAN IN 1914.

During the year 1914 reports were received relative to 196 cases of erysipelas in this State, 117 of which proved fatal.

TETANUS (LOCK-JAW) IN MICHIGAN IN 1914.

During the year 1914, there were reported to this board 36 cases of tetanus of which number 35 proved fatal.

MUMPS (PAROTITIS) IN MICHIGAN IN 1914.

During the year 1914, 23 non-fatal cases of mumps were reported to this board.

SYPHILIS IN MICHIGAN IN 1914.

Syphilis was reported present in five localities of the State, with a total of 20 cases.

GONORRHOEA IN MICHIGAN IN 1914.

Gonorrhoea was reported present in five localities of this State with a total of 20 cases.


LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
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